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AGRICULTURE

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AGRO-ECONOMICS AND ORGANIZATION

UTILIZATION OF ECONOMIC POTENTIAL OF AGRICULTURAL PRODUCTION DISCUSSED

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 10, Oct 80 pp 3-14

[Article by P. Paskar', first deputy chairman of the USSR Gosplan: "The Utilization of the Potential of Agricultural Production"]

[Text] Under the leadership of the Communist Party, our country is implementing large measures for the development of agriculture. These measures became especially large in scale after the March (1965) Plenum of the CPSU Central Committee, in keeping with whose decisions a course was taken toward accelerated growth of agricultural production and strengthening of the material and technical base of the kolkhozes and sovkhozes. Just during the past three five-year plans about 400 billion rubles have been invested in the development of agriculture. During these years fixed agricultural production capital increased 2.9-fold and by 1980 it exceeded 220 billion rubles.

At the present time there are 26,500 kolkhozes, 20,800 sovkhozes and 9,200 inter-business enterprises, organizations and associations in the country. These are large businesses that are provided with modern technical equipment. During the past 4 years of the five-year plan alone agriculture has received 1.5 million tractors, 426,000 grain-harvesting combines, more than 1 million trucks, and 317 million tons of mineral fertilizers. Under the Tenth Five-Year Plan more than 173 billion rubles were allotted to agriculture from all sources of financing. Two-thirds of the capital investments come from the state.

All this made it possible to confidently transfer agricultural production to the path of intensification. During 4 years of the Tenth Five-Year Plan as compared to the Seventh, the average annual grain production increased from 130 to 209 million tons, raw cotton -- from 5 to 8.7, sugar beets -- from 59.2 to 90.6, potatoes -- from 81.6 to 86.3, vegetables -- from 16.9 to 25.7, meat (in slaughtered weight) -- from 9.3 to 14.8, milk -- from 64.7 to 93.2 million tons, and eggs -- from 28.7 to 61.9 billion. The average annual volume of the gross agricultural output increased 1.5-fold. Even under the unfavorable weather conditions of 1979, 179 million tons of grain were harvested, the highest yield of raw cotton was obtained (9.2 million tons) and 15.5 million tons of meat (in slaughtered weight) were produced.

The structure of the nutrition of the Soviet people and the qualitative makeup of the products are improving. In 1979 the average per capita consumption of meat and meat products in the country had increased to 58 kilograms as compared to 41 kilograms in 1965, milk and dairy products -- to 319 kilograms as compared to 251, eggs -- to 233 kilograms as compared to 124, sugar -- to 42.8 kilograms as compared to 34.2, and fruits and berries -- to 38 kilograms as compared to 28. The overall calorie content of the nutrition reached an average of 3,200 calories per person per day. But the level of consumption of individual products is still inadequate: there are still difficulties in providing the population with meat, dairy products, vegetables and fruits.

The party's course toward an upsurge of agriculture was again approved in the decisions of the July (1978) Plenum of the CPSU Central Committee, which considered the question "On further development of agriculture in the USSR." Having given a positive evaluation to the work that has been done to advance agriculture, the plenum approved a program for further increase in agricultural production. The average annual gross grain yield in 1981-1985 is to be 238-243 million tons, and by 1990 it will increase to 1 ton per person on an average for the country. By the end of the next five-year plan meat production is to increase to 19.5 million tons. It will be necessary to increase the production of other agricultural products considerably as well.

Further development of agricultural production is directly related to the acceleration of the rates of intensification of agriculture and the introduction into production of highly productive strains of agricultural crops and breeds of animals that have been isolated by scientists and tested in practice, new kinds of technical equipment and advanced technologies which make it possible to achieve a steady increase in the output of products with reduced expenditures of material resources and labor.

Thus the highly productive strains of winter wheat, Mironovskaya yubileynaya, Odesskaya-51, Dneprovskaya-775, Krasnodarskaya-39, Severodonskaya, Il'ichovka and many others which were isolated and introduced into production with highly developed agrotechnology make it possible to obtain 60-70 quintals of grain per hectare and with irrigation, more than 80 quintals.

Agriculture is receiving and should introduce strains of winter wheat with shorter culms, the so-called semi-dwarf varieties, which do not lodge and have a potential productivity of up to 100 quintals of grain per hectare (Polukarlikovaya-49, Odesskaya polukarlikovaya, Odesskaya-75 and Mironovskaya nizkoroslaya).

The Dondyushanskaya State Strain Testing Station in the Moldavian SSR tested the Pallidum-90 strain of barley which produced a yield of 82.8 quintals of grain per hectare, surpassing the productivity of regionalized strains by 17.4 quintals. Other strains of spring barley will also be regionalized, as will productive strains of spring wheat, rice and millet.

Science is faced with the task of accelerating the creation and introduction into production of early ripening, medium-early and medium-ripening highly productive hybrids of corn. It will also be necessary to step up selection work for obtaining earlier ripening highly productive strains and hybrids of sun flowers that are resistant to diseases, taking into account the fact that in recent years there has been a decrease in the productivity and a deterioration of the quality of oil-bearing seeds. This related both to unfavorable weather conditions and to the failure to observe the recommended technology for their cultivation, and also the lack of a sufficient quantity of highly productive strains and hybrids of this valuable crop that are resistant to diseases.

Many demands arise in connection with questions of improving sugar beet growing and increasing the country's sugar production. In recent years there has been a significant decrease in the sugar content of the beets. Science has recommended new strains and hybrids with increased sugar content. As a result, in 1979 43 strains and hybrids of sugar beets were regionalized, including 20 one-seeded ones. And the best new strains and hybrids of sugar beets whose technology of cultivation meets all agrotechnical requirements make it possible to obtain a yield of 440-470 quintals per hectare with a sugar content in the beets of 17-18 percent.

Special attention should be given to the problem of increasing the production of food protein. The creation and introduction of alkaloid-free strains of lupin are very important. Under production conditions the best strains of it produce a grain yield of 25-30 quintals per hectare with a protein of about 40 percent. Strains of alfalfa with increased seed productivity are being introduced into production. With the appropriate agrotechnology they are capable of producing a hay yield of 100 quintals per hectare and more. The highly productive strain of peas, Neosypayushchiysya-1, with a potential productivity of up to 60 quintals per hectare, has been widely introduced. Areas planted in soybeans are being expanded and seeds of domestic strains are being used on them. The increase in the areas planted in these crops will make it possible to improve essentially the country's balance of feeds in terms of protein.

When new strains of agricultural crops are introduced into production on the kolkhozes and sovkhozes there are frequently violations of the technology for their cultivation. This leads not only to shortages in the gross yields, but also to significant deterioration of the quality of grain in a number of grain producing regions as well as to a reduction of the sugar content in sugar beets, reduced yields and deterioration of the quality of potatoes, sunflowers, and a number of other crops.

Concern for increasing the fertility of the soil and reducing the range of fluctuations in productivity from year to year should be mandatory for all specialists, scientists, agricultural collectives and also industrial enterprises that deliver modern, highly productive means of production to agriculture.

Scientific institutions of VASKhNIL have developed scientifically substantiated recommendations for applying fertilizers and lime in 22 zones of the country. In combination with other agrotechnical measures, the implementation of these recommendations, according to calculations of scientists, will make it possible to increase the effectiveness of fertilizers that are applied by 15-20 percent. But the introduction of these recommendations is being impeded by the inadequate quantity and inadequate number of types of mineral fertilizers, and especially of organic fertilizers, and also of means for their application.

An important direction in the development of agriculture is strengthening its material and technical base and providing it with modern technical equipment. During 1966-1978 agricultural enterprises and organizations spent 71 billion rubles on acquiring technical equipment and other equipment, while during the preceding 13 years they spent only 25 billion rubles. The machine and tractor fleet of the kolkhozes and sovkhozes has been almost completely replaced, and its qualitative makeup has improved. Still the supply of technical equipment for the kolkhozes and sovkhozes has not reached the optimal level. Therefore an increase in the volumes of production of agricultural equipment, especially for animal husbandry and feed production, and increase in the deliveries of it to agriculture, and improvement of the quality of technical equipment in the current stage and in the future are among the most crucial tasks.

A large problem in the development of agricultural machine building is the production of sets of agricultural machines and implements that are necessary for comprehensive mechanization of production processes in branches of farming and animal husbandry. The system of machines for complete comprehensive mechanization of agriculture is still being slowly assimilated by machine building. Yet the shortage of machine equipment prolongs the time periods for conducting agricultural work, especially harvest work, and leads to shortages in the harvest and the destruction of a considerable part of the crop that has been raised, and it also makes it necessary to use less productive and heavy manual labor in agriculture, retards the growth of labor productivity in agriculture, and reduces its efficiency.

Thus when conducting amelioration work in agriculture, expanded utilization of automated sprinkling systems of the Fregat and Volzhanka type (using wide-grasp technical equipment) for mechanization of irrigation in the European part of the country and also highly productive irrigation machines from Central Asia where sprinkling is not done make it possible to reduce considerably the labor-intensiveness of work done in irrigation, which is especially important when there is a shortage of labor force. The urgency of this problem is increasing because of the fact that 60 percent of the land in the country is irrigated manually by the surface method, on which 5.5 million man-days of manual labor are expended annually.

Agricultural workers are faced with large tasks in the matter of increasing the efficiency of public animal husbandry and changing it over to an industrial basis.

Scientific institutions of the country have developed new technologies for industrial production of milk, beef and pork, and for raising young animals to replenish the herd which are used in animal husbandry complexes of the industrial type. With observance of the established technology for producing animal husbandry products, a number of complexes have achieved good economic indicators. Thus on the large complexes for producing beef in the Ukraine, Belorussia and the Bashkir ASSR, the average daily weight gain amounts to 970-1,046 grams with labor expenditures equal to 3.5-5.0 man-hours per 1 quintal of weight gain, and the profitability of production is high.

On 120 dairy complexes and sovkhozes of the Estonian SSR, with an average annual milk yield per cow of 3,400-3,500 kilograms, labor expenditures amounted to 3.1 man-hours per 1 quintal of milk, the production cost was 19.96 rubles, and the profitability of production was 29 percent. In 1979 the average annual milk yield from one cow amounted to 2,811 kilograms while the average for the country on these categories of farms was even lower.

In order to increase the productivity of the livestock and improve the organization of the production of animal husbandry products, it is very important to improve existing and to create new, highly productive breeds and lines of animals, including animals that meet the requirements of industrial technology. Scientific institutions have developed a system for work on breeding farms and in industrial complexes. Planned improvement and regionalization of breeds is taking place in the country and breeding resources are being evaluated and utilized.

Additionally, in the near future it will be necessary to solve problems of determining the optimal sizes of animal husbandry complexes with respect to various animals and agroclimatic zones. Since most of the animal husbandry products will be produced on existing farms, special attention should be devoted to the development and introduction of plans for their reconstruction, including changing production over to an industrial basis.

With the increase in agricultural production there is also an increase in the role of organizational factors that exert an influence on the development of various forms of cooperation. In this connection it is envisioned: to change over from mainly general and uncoordinated production of agricultural products to deeper specialization and concentration; to combine the efforts of kolkhozes and sovkhozes for the construction of enterprises of an industrial type; and to develop extensive production ties among specialized enterprises.

After the adoption of the decree of the CPSU Central Committee of 28 May 1976, "On Further Development of Specialization and Concentration of Agricultural Production on the Basis of Interbusiness Cooperation and Agro-Industrial Integration," the oblasts and republics did a large amount of organizational work. The process of specialization and concentration of agricultural production on the basis of interbusiness cooperation and agro-industrial integration has embraced all union republics, although to varying degrees.

In 1979 the country had a total of more than 9,000 operative interbusiness enterprises, organizations and associations, and more than 143,000 businesses had entered into cooperation with them (many kolkhozes, sovkhozes and other state and cooperative enterprises and organizations are participants in several joint industries). As a rule, enterprises, organizations and associations that operate on the basis of cooperation have economic efficiency and exert a positive effect on the economies of the kolkhozes and sovkhozes.

For example, since 1974 the Kolkhoz imeni Uritskiy in Gomel'sksya Oblast in the Belorussian SSR has been fulfilling the functions of an interbusiness enterprise by completing the raising of young animals and fattening large horned cattle on the basis of cooperation with 17 kolkhozes of the rayon. In 1979 this interbusiness enterprise fattened and sold the state about 7,000 head of livestock with an average weight of 435 kilograms. Moreover, 96 percent of the slaughtered livestock were in good nutritional condition. The enterprise's profitability amounted to 72 percent.

The Velikiy Oktyabr' interbusiness hog-raising complex in Buturlinovskiy Rayon in Voronezhskaya Oblast has been in operation for more than 10 years, annually selling the state up to 7,000 tons of pork. During this time the pork production on the farms that participate in the cooperation has increased 3-fold, feed expenditures per 1 quintal of weight gain have decreased by 33 percent, and labor productivity in the branch has increased 3.3-fold. The sum of profit obtained annually from hog raising has increased more than 4-fold, and expenditures on the construction of the complex have been recouped twice over.

Interbusiness formations in the sphere of agricultural services exert a significant influence on increasing the economic efficiency of kolkhoz and sovkhoz production. These include electrification, chemization, land reclamation, mechanization, artificial insemination of animals, and other kinds of production activity.

Thus an interbusiness enterprise for land reclamation has been in operation in Balakovskiy Rayon in Saratovskaya Oblast since 1975. During the time of its operation the output per one sprinkler has increased 1.5-fold and the cost of irrigating a hectare has decreased by 36 percent. The value of the gross output raised on 1 hectare of irrigated land increased by 68 percent in 3 years.

In recent years the country has seen the development of processes of agro-industrial integration whereby there is a combination of the production of agricultural products, their sales in fresh form and their processing. This makes it possible to increase the production volume considerably, to reduce losses and to improve the quality of fruits and vegetables and other perishable products.

In 1975 the Georgian SSR created an agro-industrial-trade association under the republic Ministry of Agriculture which operates on the principle of "field--store." This made it possible in 1978 as compared to 1974 to increase the sales of potatoes 4-fold, the sales of vegetables -- 1.5-fold, and the overall commodity turnover -- 2-fold. In 1978 142,000 tons of vegetables and 59,000 tons of potatoes were produced and sold in the trade network. This was a 1.9-fold increase over 1974. At the present time the association provides 58 percent of the vegetables and 45 percent of the potatoes in state procurements of the republic's public sector for these kinds of products.

High efficiency has been achieved in the Stavropol' agro-industrial association, Stavropol'ovoshchpromtorg.

But along with the positive results in the development of the processes of specialization and concentration of agricultural production on the basis of interbusiness cooperation, there are also shortcomings, omissions and sometimes many mistakes which impede development. The most typical shortcoming is the lack of a sufficiently complete comprehensive approach to the development of plans and the implementation of measures for specialization and concentration of production. The attempt to artifically single out from the existing system of farms only the development of a specific interbusiness formation with its coordination with the solutions to other problems frequently makes it more difficult to obtain the proper production effect. For example, in Rostovskaya Oblast, because of the lack of an all-around comprehensive approach, the capacities of the Kamenskaya interbusiness base for fattening hogs have been utilized by only 60 percent for a number of years. In Lipetskaya Oblast interbusiness animal husbandry enterprises are not supplied with sufficient feeds. The farms participating in the Veselinovskoye interbusiness enterprise in Nikolayevskaya Oblast in 1978 fulfilled contractual commitments for the delivery of young animals for fattening by only 36 percent. In the country as a whole at the beginning of 1979, for various reasons, interbusiness enterprises either failed to utilize or utilized for only a short period during the year 13 percent of the buildings for large horned cattle, every fifth building for hogs and every fourth building for sheep.

Specialization and interbusiness cooperation do not constitute a campaign, but a complex and multifaceted process, a main direction in the development of agriculture. The success of the matter can be ensured only if problems of this process are resolved on a scientific basis, in a planned and well-thought-out way, along with the implementation of other measures for intensification of agricultural production.

With the development of interbusiness cooperation there has been an increase in the role and significance of production-economic and organizational ties and interrelations among businesses that are partners in joint production. With the appearance of interbusiness formations, kolkhozes and sovkhozes have found common interests; it has become necessary to organize the administration and planning of joint production, to determine the policy for distributing production results of joint activity and to offer mutual guarantees. The corresponding financial relations have thus become more complicated.

But not enough attention is being devoted to these problems. There are cases where the policy for distributing profit is violated, and the amount of profit necessary for the fulfillment of the plans of the businesses participating in interbusiness enterprises are reduced; there is confusion and inadequate substantiation in the formation of fixed and circulating capital, and so forth. For example, in 1978 almost half of the interbusiness formations engaged in fattening applied calculated prices that did not provide the businesses that supplied livestock with reimbursement for expenditures on production and the completion of the raising of the young animals. Reduced calculated prices that do not correspond to the publicly necessary expenditures in each technological stage of production dissipate the interests of the kolkhozes and sovkhozes in cooperation, impede the development of interbusiness formations, disturb their production rhythm and reduce the efficiency of their activity.

In the work of interbusiness formations for serving agricultural production there is frequently an attempt to increase profit by increasing the calculated prices for services rendered to kolkhozes and sovkhozes.

In certain oblasts and republics there are still a considerable number of interbusiness enterprises that have been created without a preliminary study of the existing possibilities for their activity. They operate unsatisfactorily and allow large losses which, in keeping with existing provisions, must be covered by the kolkhozes and sovkhozes that have created these enterprises. When the interbusiness enterprises do not have the necessary funds, reimbursement must be made for this sum from the funds of the kolkhozes and sovkhozes that have created these enterprises.

There are other shortcomings that are typical when measures are taken locally for interbusiness cooperation. Thus a considerable number of interbusiness organizations have been created where no economic activity is carried out; there are more than 3,500 of them in the country as a whole. In a number of cases the interbusiness organizations and institutions are created in the sphere of administration unnecessarily. Such, for example, are interbusiness dispatcher groups, houses of scientific and technical education, groups for zootechnical accounting, and so forth. The result is an unjustified increase in the number of administrative personnel and the withdrawal of kolkhoz and sovkhoz funds for these purposes. In

Voronezhskaya Oblast alone the creation in the sphere of administration of interbusiness groups under rayon agricultural administrations has led to an increase in the number of administrative personnel of 311 people, and the kolkhozes spend 634,000 rubles a year to maintain them. Moreover, in many cases these organizations are created even when similar state services exist in the oblast.

Frequently interbusiness enterprises are created not on the basis of existing kolkhozes and sovkhozes, but as independent businesses. This leads to an increase in the number of enterprises and a dispersion of the utilization of land; there arises a need to construct new administrative buildings, storehouses, garages and other structures. Thus in Maykopskiy Rayon in the Adygeyskaya Autonomous Oblast on the land of the Put' k Kommunizmu Kolkhoz an interbusiness enterprise has been constructed for fattening 5,000 head of large horned cattle a year, and an independent business has been formed with an administrative staff of 30 people, even though the kolkhoz could have performed the administrative functions for this business.

The decree of the CPSU Central Committee, "On Further Development of Specialization and Concentration of Agricultural Production on the Basis of Interbusiness Cooperation and Agro-Industrial Integration," emphasized that the main goal of specialization and concentration is a considerable increase in the production and sale to the state of agricultural products, improvement of their quality, increased labor productivity and a reduction of expenditures. At the July (1978) Plenum of the CPSU Central Committee, L. I. Brezhnev said in this regard: "We do not need just any associations, but those which actually raise socialist collectivization of production and labor to a new level, which are based on the latest achievements of science, technical equipment and technology, which provide for greater productivity, and which produce a maximum of inexpensive products."*

The production and economic potential that has been created in agriculture and the great creative possibilities of the increased number of skilled specialists on kolkhozes and sovkhozes have still not been fully utilized for increasing agricultural production and its efficiency. One of the reasons for this is the failure to observe principles of planning that envision a combination of centralized leadership and economic independence of enterprises, the development of initiative, and increased responsibility and motivation of managers, specialists, kolkhoz workers and other workers in the final results of labor.

In a number of oblasts and republics the established policy for planning is sometimes violated: the higher agencies give the farms indicators for the sizes of planted areas and the productivity of agricultural crops, the number of head of livestock and their productivity and others that are not envisioned by the state plan for the economic and social development of the USSR. Moreover, when approving assignments for procurement of agricultural products, local agencies do not always give the farms plans for deliveries of material and technical means that provide for the corresponding increase in the output of products. There are frequent cases where, when planning the development of agriculture locally, they do not adequately take into account the directions of the production activity of the farms or their specialization. Such an approach impedes production growth and leads to an increase of the cost of producing products.

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* L.I. Brezhnev, "O dal'neyshem razvitii sel'skogo khozyaystva SSSR" [On Further Development of USSR Agriculture], Moscow, Politizdat, 1978, p 36.

One should also take note of the recent appearance of a number of plans for the procurement of agricultural products (instead of a single plan for procurement that is calculated for 5 years) and also the practice that has arisen of making unjustified changes in them.

Accelerated rates of development and increased efficiency of agricultural production require: improvement of planning and economic stimulation of agriculture; an increased role for plans in the mobilization of reserves and capabilities of kolkhozes and sovkhozes for increasing the output of products; and increased motivation and responsibility on the part of business managers, specialists, kolkhoz workers and other workers for more efficient utilization of land and material and labor resources.

In order to increase the efficiency of agricultural production so as to satisfy more fully the needs for food products and goods from agricultural raw material, it becomes very important to reduce losses both directly in the sphere of agricultural production and in the stages of storage and processing of agricultural products and raw materials. At the expanded meeting of the USSR Gosplan held in February 1979 they considered questions of reducing losses and improving the quality of agricultural products. In keeping with the materials from the discussion, the USSR Gosplan adopted an appropriate decree which notes, in particular, that significant losses of agricultural products are the result of the following shortcomings that exist in supplying the sovkhozes and kolkhozes with highly productive harvesting equipment and specialized transportation; arrears in the development of the material and technical base for storing and processing products; the slow introduction of progressive means and methods of transportation and storage of products; serious omissions in the work of procurement and trade organizations; and tardiness in conducting scientific developments for seeking out efficient means of fighting against losses.

". . . Agriculture is a constituent part of the agro-industrial complex which is called upon to provide the country with raw material and foodstuffs. The measure of success should be not only the crop that is gathered, but, above all, that which goes to the consumer — to the counters of the stores, to the kolkhoz markets, to the tables of the Soviet people. This is the final result of all efforts and it should be considered the main thing,"* said L. I. Brezhnev in a speech before the electorate of the Baumanskiy electoral district of Moscow in March, 1979.

The party has set the following task: to improve in an important way the production and economic cooperation between agriculture and those branches of industry which are directly related to it; to provide a unified statewide approach to the development of the entire agro-industrial complex.

In the methodological guidelines for drawing up state plans for the economic and social development of the USSR which were approved in March, 1980 by a decree of the USSR Gosplan, the development of the national economic agro-industrial complex is singled out as an independent object of planning. One of the main tasks of planned control of the development of the country's agro-industrial complex is to provide for an increase in the production of high-quality agricultural products, and prompt procurement, transportation, storage and industrial processing of them for the manufacture of food products, clothing, footwear and other consumer goods.

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* L. I. Brezhnev, "Leninskim kursom" [With a Leninist Course], Vol. 7, Moscow, Politizdat, 1979, p 619.

When drawing up plans for the development of the agro-industrial complex, the decree recommends that the following needs be used as a basis:

the satisfaction of the needs of the country's population for foodstuffs according to scientifically substantiated norms for consumption, and the needs of light industry for raw material, based on the volumes of production of fabrics, clothing and footwear, in keeping with rational consumption norms;

an increase in export resources of agricultural products, goods from light industry and the food industry, agricultural technical equipment, mineral fertilizers and other material resources;

the surmounting of essential differences in the conditions for production, the level of life and the cultural and domestic services for rural and urban population, and also the transformation of agricultural labor into a variety of industrial labor;

the ensurance of proportional development of branches, sub-branches and industries that are parts of the agro-industrial complex;

improvement of production and economic relations among branches of the agro-industrial complex and the ensurance of intercoordinated work on their part;

an all-around increase in the efficiency of production, improvement of the utilization of natural and industrial resources, and also the provision for fuller utilization of agricultural products and the elimination of losses of them.

The agro-industrial complex is among the complicated socio-economic systems whose functional-branch structure includes branches, sub-branches and service systems that perform various functions in the overall technological chain for producing the final product which are intercoordinated by economic relations. Proceeding from the functions of branch units of the agro-industrial complex, it seems possible to single out three main spheres.

The first sphere is the totality of branches (sub-branches) of industry that supply agriculture, light industry, the food industry and the meat and dairy industry as well as the procurement system with means of production. It includes tractor and agricultural machine building, machine building for animal husbandry and feed production, machine building for light industry and the food industry, the production of specialized automotive transportation, land reclamation equipment, the chemical industry in so far as it produces mineral fertilizers and chemical means of plant protection, the combination feed and microbiological industry, agricultural and material-technical support for branches of the agro-industrial complex, and also the production of specialized equipment and instruments for them.

The second sphere is agricultural production itself: branches of crop growing and animal husbandry, and also production-technical, agrochemical and veterinary-sanitation services for agriculture.

The third sphere is the totality of branches and industries that provide for procurement, transportation, storage and processing of agricultural raw material: the food, meat and dairy, and milling and groats branches of industry; light industry enterprises for initial processing of agricultural raw material; and procurement organizations (including trade, public catering, and consumers' cooperation in so far as they are involved in the procurement, storage and processing of fruits, vegetables, potatoes and other agricultural products).

With such a formation, the agro-industrial complex includes a broad sphere of the country's economy which accounts for a considerable proportion of the volumes of production of products in the national economy as a whole as well as for fixed capital and the number of employed personnel. Products of branches of the agro-industrial complex comprise more than 40 percent of the overall production volume in the national economy.

In addition to strengthening the material and technical base for agriculture, special attention should be devoted to the development of enterprises that process agricultural products, that is, the third sphere of the agro-industrial complex. Nowadays an ever increasing proportion of agricultural products undergo preliminary processing before going to the consumer. While in prewar years 2.8 percent of the gross yield of agricultural products underwent industrial processing in our country, in recent years more than 50 percent do. But the disparity between the volume of production of agricultural raw material and the capacities for processing it is still decreasing slowly.

Divisions of the USSR Gosplan, in conjunction with gosplans of union republics, ministries and departments of the country, have developed and are implementing extensive measures for the creation of the necessary conditions for complete preservation of agricultural products. It would be expedient for these measures to be reflected concretely in the plans for our country's economic and social development under the Eleventh Five-Year Plan. Much must also be done by branch scientific research institutes which are called upon to contribute to all-around improvement of technical equipment and technology that is used in the production, harvesting, storage, processing and and sales of agricultural products.

One of the main tasks for the development of the country's agro-industrial complex in the modern stage is its further improvement and formation as a unified system of planning and administration. With the existing methods of planning production under the conditions of a multibranch agro-industrial complex there are frequently omissions and disproportions, which lead to significant national economic outlays. The existing system of branch planning does not always provide for a community of interests of the branches in achieving final results.

Thus the system of indicators of the national economic plan for the development of the agro-industrial complex and its individual spheres and subdivisions should be oriented toward achieving the final goals of the complex and its efficient functioning as a whole. This is why it becomes especially important to consider the point made by L. I. Brezhnev in his speech at the festive meeting in Alma-Ata devoted to the sixtieth anniversary of the Kazakh SSR and the Communist Party of Kazakhstan to the effect that now in the country "it is important to have a special food program."

The expediency of creating a unified administrative agency for the country's agro-industrial complex (the state agro-industrial committee of the USSR Council of Ministers with central and local branches) and other questions of administration of units of the agro-industrial complex have been discussed more and more actively in recent times. All this deserves attention and requires careful development. Here it is necessary to keep in mind that the balance and proportionality of the complex and its individual spheres depend directly on the level of planning and administration of the national economy. Therefore we should continue to search for new forms and methods of improving planning and administration of the agro-industrial complex in the system of the national economy as a whole and provide for efficient utilization of the immense potential of agricultural production which is created for successfully solving the country's food problem The decree of the CPSU Central Committee, "On Further Improvement of the Economic Mechanism and Tasks of Party and State Agencies," and of the CPSU Central Committee and the USSR Council of Ministers, "On Improving Planning and Stepping Up the Influence of the Economic Mechanism on Increased Production Efficiency and Improved Quality of Work," are directed toward this.

At the November (1979) Plenum of the CPSU Central Committee L.I. Brezhnev set large and responsible tasks in the area of solving the food problem. He devoted special attention here to the development of other branches of the agro-industrial complex and, above all, to the organization of storage and processing of products and the elimination of losses. Referring to problems of planning and administration, L. I. Brezhnev noted that agricultural production cannot be considered "separately from the system of procurements, transportation, storage, processing and trade in food products. All this is a unified food complex. And it should be planned as a unified whole."* The task consists in developing correct methods and forms of work for implementing these party instructions and, even under the Eleventh Five-Year Plan, revealing and utilizing reserves for increasing agricultural production and increasing the efficiency of each branch of the agro-industrial complex.

There is no doubt that many issues related to the achievement of high final results in providing the population with food and industry with raw material are also closely related to solving the basic social problems of rural areas in the modern stage. At the July (1978) Plenum of the CPSU Central Committee it was again emphasized that, in addition to increasing the production of agricultural products, it is necessary in all ways to increase efforts for equalizing the material and cultural-domestic conditions for life in the city and the country.

The main directions for social progress in rural areas can be reduced to the transformation of agricultural labor into a variety of industrial labor, the development of agro-industrial integration, the improvement of highway and transportation ties between the city and the country and within rural areas, the equalization of incomes and the structure and levels of consumption of the rural and urban population, the equalization of social and cultural conditions for life, and the development of trade and domestic services, and housing and communal services in rural areas. This list alone shows the diversity and complexity of the problems related to equalizing the material and cultural-domestic conditions of life in the city and the country.

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* L. I. Brezhnev, "Speech at the Plenum of the CPSU Central Committee of 27 November 1979, Moscow, Politizdat, 1979, p 19.

But regardless of how diverse the social problems of rural areas may be, their consistent solution makes it possible to provide for a harmonious balance between means of production and labor force, increased labor productivity and efficient utilization of land, technical equipment and other production capital, and it also makes it possible to advance along the path to achieving social uniformity of the society that is based on a communist attitude toward labor.

The final year of the Tenth Five-Year Plan, the year of Lenin's anniversary, is coming to an end. In preparing a worthy greeting for the 26th CPSU Congress, rural workers are concentrating their efforts on the struggle for a further increase in the efficiency of public production, successful completion of the harvest without losses, fulfillment of socialist commitments that have been made for the sale to the state of grain, meat, vegetables and all kinds of products from farming and animal husbandry, and the provision of animal husbandry with feed. Further all-around development and implementation of the Leninist agrarian policy is a nationwide task whose solution will make it possible to raise the material and cultural level of the life of the Soviet people.

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TILLING AND CROPPING TECHNOLOGY

UKRAINIAN MINISTRIES OF AGRICULTURE, SOVKHOZES ADVICE ON 1981 CROP WORK

Kiev SIL'S'KI VISTI in Ukrainian 3 Oct 80 p 2

[Ukrainian Ministries of Agriculture and Sovkhozes: "Fall Plowing of Winter Fallow as Leaders"]

[Text] In preparing an appropriate welcome for the 26th CPSU Congress agricultural workers are making an effort to successfully complete fall field work, fulfill the plans and obligations of the final year of the Tenth Five-Year Plan, and establish a strong foundation for increasing the production of grain, sugar beets, potatoes, vegetables, feed and other agricultural crops in the first year of the 11th Five-Year Plan.

Many years of the republic's kolkhoz and sovkhoz experience testify to the fact that one of the basic conditions for obtaining a high and guaranteed yield of spring crops is timely and high quality winter fallow plowing.

The Ukrainian Ministry of Agriculture and the Ukrainian Ministry of Sovkhozes examined the state of winter fallow plowing and noted that many farms pay considerable attention to this work. Continuous, mechanized tilling detachments were created, units are manned with experienced tractor operators for two shift task fulfillment is checked.

Fall plowing of winter fallow is well done on farms in the Voroshilovgradskaya Oblast. Forty-three percent of plowing has been accomplished here, and in the Starobil'skoy Rayon — 68 percent, and Kreminskoy 58 percent. At the kolkhoz imeni Lenin in Starobil'skoy Rayon 70 percent of the area assigned to fall plowing has already been done. Two teams work during plowing on a two shift basis; they are assigned 14 tractors. Organic and mineral fertilizers are generally applied under the plow. Instead of the assigned 18,000 tons of manure for September, 22,000 tons were applied. Every shift change farm specialists provide an appraisal and check in the work accomplished. A timely technical service has been organized as well as eating and rest periods for machine operators. Moral and material stimuli are utilized. The red flag is raised in honor of work leaders.

At the kolkhozes and sovkhozes of the Kharkov area 106 mechanized inter-farm detachments are involved with plowing having at their disposal 1,170 tractors furnished by kolkhozes, sovkhozes, agricultural and other organizations. Detachments are headed by specialists from rayon agricultural administrations, rayon agricultural technology, and rayon agricultural chemistry administrations. Detachments work according to graphics, plowing winter fallow on farms which assigned machinery to these units. The variable output per tractor reached 7.5 - 8 hectares here.

Farms in the Krymskoy, Oktyabrskoy and Rovenskoy sovkhoz trusts are also plowing winter fallow quickly. Mechanised detachments are active in most sovkhozes here, the group work method has been introduced, machinery is used during two shifts. Field machine service has been set up, machine refueling during plowing. Appropriate cultural and living conditions have been set up for the machine operators, socialist competition is encouraged among them with daily summarising and util'zation of moral and material stimuli. By September 28, these sovkhoz trust farms fulfilled 56-50 [sic] percent of the planned plowing under spring crops.

The "Zelenohirs'kyy" sovkhoz of the Krymskoy trust, Belogorskoy Rayon, and sovkhoz "Krasnovka" Oktyabrskoy trust and "Pryvol'nyy", Krymskaya Oblast, fulfilled 80-85 percent of the planned fall plowing of winter fallow.

Yet, on many farms fall plowing for winter fallow is accomplished slowly. The most delay in plowing was allowed on farms in Zhitomirskaya, Lvovskaya, Sumskaya, and Chernovitskaya Oblasts, only between 9 and 15 percent of their plans were fulfilled. Farms in Sumskoy, Kirovogradskoy, Ternopolskoy, Pivdenno-Donetskoy, Chernigovskoy, Kamyansko-Dneprovskoy sovkhoz trusts are also delaying this work, only 10-15 percent of the planned area has been plowed.

On a number of farms the delay in plowing was caused by the fact that in many kolkhoses and sovkhoses powerful tractors are used only during one shift, and not everyone pays sufficient attention to the group work method. Areas are relieved of predecessors slowly. Calculations show that with the exception of some all purpose tractors which were used in this year's harvest, hauling manure and other work, there exists a possibility on the republic's farms for using a third more tractors for plowing.

Machine operators of the Zhitomirskaya Oblast are able to plow 7.4 thousand hectares of winter fallow every twenty-four hours, however, in the five days between September 15 and 20 they plowed on the average only 1.7 thousand hectares in twenty-four hours; in Ivano-Frankovskaya Oblast correspondingly 9.2 and one thousand, Sumskaya 13.6 and 3.5 thousand hectares. In those and other oblasts very few tractors work at night. Thus, by September 26 (according to work data) on farms in Khersonskaya Oblast only 40 tractors plowed during the second shift, 162 in Kievskaya, 185 in Chernovitskaya, and 190 tractors in Nikolaevskaya Oblast.

Proper attention is not paid everywhere to utilizaing highly productive machinery, and to the fulfillment of their output norms by tractor operators. Therefore, the average daily output per tractor in fall plowing of winter fallow in Lvovskaya Oblast amounts only to 2.8 hectares, Zhitomirskaya - 3.5, Ivano-Frankovskaya 3.6, Rovenskaya 4, and Vinnitskaya 4.5 hectares.

Fulfilling the basic steps towards increasing soil productivity, farms in the Voroshilovgrad area already filled the yearly plan for manure hauling. With a goal of 9.5 million tons, 10.3 million tons reached the fields. Organic fertilizer production was increased, compared to last year, by kolkhozes and sovkhozes in Volynskaya and Ivano-Frankovskaya Oblasts. Yet, they are not utilized most effectively everywhere for soil improvement through liming and gypsum application. In the nine months of this year, farms in Chernigovskaya Oblast decreased organic fertilizer hauling to 2.3 million tons, compared to last year, in Poltavskaya Oblast to 2.1 million, and Dnepropetrovskaya to 1.8 million. On September 1 only 10 percent of the planned liming was done in Khmelnitskaya Oblast, 19 percent in Sumskaya Oblast, 22 percent in Poltavskaya and Vinnitskaya Oblasts, and 27 percent in Zhitomirskaya Oblast. Gypsum application has been delayed by kolkhozes and sovkhozes in Zaporozhskaya, Donetskaya, Dnepropetrovskaya, Nikolaevskaya and Odesskaya Oblasts.

Areas over which industrial machinery will be used need special preparation. Next year the area for growing corn, sunflowers, soybeans, sugar beets, potatoes, vegetable and some other crops according to progressive technology will be markedly expanded. Even this year in unfavorable weather conditions, work experience has shown that these technologies assure a marked increase in harvest primarily on those farms which adequately prepared the soil with good organic and mineral fertilizer application. For example, field workers in Bolgradskoy, Tatarbunarskoy, and Saratskoy Rayons in Odesskaya Oblast, thanks to the application of industrial technology, are harvesting today 60 and more quintals of corn seed per hectare, and have already started active preparation for growing the next crop. To fields set aside in advance, 20-25 tons of organic fertilizer and 6-7 quintals of mineral fertilizer per hectare are applied. Previously furrowed areas are plowed to a depth of 27-30 cm, carefully covering post-harvest remains, immediately levelling the furrow crests. Yet, a check up has indicated that on some farms there is some incidence of lack of controls and inadequate soil preparation. This leads to moisture losses, and weed and pest infestation.

The Ministry of Agriculture and Ministry of Sovkhozes Collegiums committed the managers of oblast and rayon agricultural administrations and sovkhoz trust directors to the use of urgent measures to speed up and increase the quality of winter fallow plowing.

The maximal amount of tractors possible should be assigned to plowing, all plowing units should be manned with two tractor operators, night shift work should be organized, and plowing detachments headed by managers and chief farm specialists should be created in all kolkhozes and sovkhozes. Technology maneuvering in kolkhozes and sovkhozes and between farms and rayons should be made possible so as to utilize all technological means on hand most rationally.

During the fall field work period twenty-four hour service by shops and technical agricultural and farm service points should be organized.

Hauling and application of organic and mineral fertilizer should be increased; attention should be given to fulfilling the set tasks in liming and soil gypsum application to provide for fertilizing first areas assigned for growing corn, sunflowers, soybeans, sugar beets, potatoes, vegetable and other crops according to industrial technology. Efficient work by mechanized subdivisions of rayon agricultural chemistry and kolkhoz and sovkhoz productivity detachments should be organized without shifting their technological means to accomplish other work.

To prevent wind and water erosion and to decrease moisture losses it is essential to expand the use of surface tilling and stubble preservation under spring crops; on irrigated lands plowing should definitely provide for a deeper plowing layer.

Essential cultural-living conditions must be established for those working in the fields, transportation to their work area must be arranged for workers, also warm food and rest trailers should be set up, and a control over work quality should be established. A socialist competition should be started among farm machine operators for highly productive technology utilization and timely fulfillment of the whole complex of fall agricultural work.

9443
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ADVICE ON WINTER CROP WORK IN LIGHT OF LATE HARVEST IN UKRAINE

Kiev SIL'S'KI VISTI in Ukrainian 17 Aug 80 p 2

[Article by group of authors: "Tomorrow's Harvest Must Be Prepared Today"]

> [Text] Winter grain crops are the basic grain crops of the Ukraine. Their gross harvest determines to a large extent the overall extent of grain production in the republic. This year because of a delayed harvest and a decreased sowing area preparation period unusual circumstances developed for winter crop sowing preparation. As a result, kolkhoz and sovkhoz managers and agricultural organ specialists are called on to provide for high operativeness in work, and utilize a creative approach to the fulfillment of all agricultural measures.
>
> Many farms of the republic have accumulated experience in growing high and steady yields of winter crops. Unfortunately, potential possibilities of new intensive varieties are not yet utilized everywhere. What must be done to get full returns from them?

Correct Allocation of Winter Crops in Crop Rotation

Leading farms allocate most of the winter wheat crops after better predecessors on clean fallow and also fallows occupied by perennial and annual grasses, winter crops and corn for green chop, pulse crops, etc. Another part of the crop is allocated after unfallow predecessors--corn for silage, and grain spike crops.

This year's conditions do not provide reasons for changing the established composition within crop rotation and their correlation to the predecessors. Although corn does develop late, this predecessor should be utilized to the extent anticipated in crop rotation. Harvesting the silage mass on areas which are set aside for crops of winter wheat should be started during an earlier phase of its ripeness than normally so as to finish the soil tilling prior to the arrival of optimal sowing dates.

The worst predecessors for winter wheat are grain spike crops. Thus, for next year's harvest, areas of stubble predecessors must not be expanded beyond the limits anticipated by crop rotation practiced on the farm. Those should be selected which were allocated after better predecessors, applying a complex of measures directed towards improving the air and nutrient soil regimes.

The Soil Must Be Well Prepared

This problem is particularly important this year because of the shortened period between harvesting the predecessors and sowing of winter crops. Farm specialists must approach the matter creatively, with consideration of soil and weather conditions, dates of harvesting predecessors, the availability of soil working equipment, to avoid violations in the recommended dates for work fulfillment. It is important to conserve moisture (particularly in the top soil layer), especially in rayons with insufficient and unstable moisture. On clean and occupied fallows this is done by layer cultivation with gradual decrease in the depth of soil working from 12-14 to 6-8 cm. When moisture is lacking, cultivators should be used with cultipackers assuring soil packing and decreasing evaporation. Upon appearance of annual weed sprouts on clean areas, harrowing should be done instead of cultivation.

Mechanical measures and application of herbicides (group 2,4D) should be combined over weed infested areas. This will permit a decrease in the number of fallow cultivations conserving soil moisture. In the extreme south, on fields infested by pink knotgrass, massive and selective soil working is combined for areas where the weed is widespread.

Surface tilling to a depth of 8-10 cm should be utilized on areas after peas. Disk harrows or sweeps are used combined in units with needle and spiked rollers. A slightly lumpy, levelled soil surface is created and a packed bed at a depth of seed covering promoting the appearance of timely even sprouts of winter crops. After a basic tilling, the soil is maintained in a clean, loosened condition until sowing start thanks to cultivation or harrowing.

This year the soil working method on areas after corn for silage will be determined first of all by its harvesting date. Because in most territories of the republic silage mass harvesting dates will almost coincide with the arrival of optimal dates for sowing winter crops, surface tilling will have to be the basic method of soil working. It includes post harvest harrowing, a basic surface tilling and a pre-sowing cultivation.

Post harvest soil mulching to break up nitritious corn remains and to create a loosened upper layer should be conducted at a depth of 4-6 cm in two directions with disk mulchers LDH-15, LDH-10, LDH-5 or with heavy disk harrows BDT-7, BD-10, BDT-3. After harrowing and successive fertilizer application, a basic surface tilling to a depth of 8-10 cm is done utilizing sweeps KPSH-9, KPSH-5, KPP-2,2, KPE-3,8 and KPH-250 or disk harrows and stubble mulchers and also plowshare stubble mulchers without cutting blades.

In order to bring the top soil layer up to an appropriate sowing condition area sweep tilling is combined with top layer loosening with a BIH-3 needle harrow or disk equipment together with spiked rollers. To create a smoother sowing bed, a pre-sowing cultivation to a depth of 6-8 cm with sweep-type working organs is done also after surface tilling.

The basic method of soil working after stubble predecessors this year must be plowing with prior mulching. The latter will play an important role in improving the phytosanitary state of these fields. Breaking up and covering stubble in the top layer will hasten its mineralization which will deprive root rot pathogenes of their source of nourishment.

Mulching effectiveness rises when a seven to eight day interval is adhered to between it and the next plowing. Plowed fields must be immediately prepared for sowing winter crops by harrowing, cultivation and packing.

In the south when moisture is lacking surface soil tilling is done on relatively weed-free fields.

For better soil moisture accumulation in eroded areas and fields where ordinary surface or sweep tillage is used chapping should be done to a depth of 50-60 cm. For this purpose chappers ASHCH-2-140 are used or reconstructed sweeps--deep subsurface rototillers KPH-250, KPH-2-150 and also special adapters which are attached to the PN-4-35 plow frame.

Fertilizers Should Be Utilized Rationally

According to research establishment data over many years, winter wheat harvest increase following application of full mineral fertilizer in recommended doses amounts to 3 - 5 quintals per hectare in rayons with insufficient and unstable moisture, 5 - 7 and more quintals per hectare in adequate moisture areas.

The fertilizing system for winter crops is determined by their place in crop rotation. Winter wheat utilizes the direct action of manure and composts when it is allocated after clean or occupied fallows, and the delayed action, especially in the Polissya area, after row crops (corn, potatoes). Leading farms apply organic fertilizer in doses of between 30-50 tons per hectare after stubble predecessors.

Considering the demanding nature of the intensive type varieties to soil nourishment regime, all winter crops should have mineral fertilizer applied to them in appropriate doses and correlations depending on soil productivity, predecessors, fertilizing in crop rotation, variety and level of the planned harvest.

On insufficiently fertilized areas mineral fertilizer should be applied under the basic soil tilling or under pre-sowing cultivation mostly locally with cultivators - plant top dressing equipment.

In the steppe, on regular chernozem after black fallow, phosphorus fertilizers are most effective; they are applied together with potash 30-40 kg per hectare. After occupied fallow we recommend the use of 40-60 kg of nitrogen and phosphorus and 30-40 kg potash. After unfallow predecessors the doses should be increased to 60-80 kg nitrogen, phosphorus and potash.

In the leftbank forest steppe rayons, on deep chernozems after perennial grasses, phosphorus and potash fertilizers should be applied, 40 kg activated liquid per hectare; after occupied fallows full mineral fertilizer should be used in the following doses: 30-40 kg nitrogen, 40-60 kg phosphorus and 40 kg potash per hectare.

After unfallow predecessors nitrogen and phosphorus norms should be increased to 60-90 kg.

In the rightbank forest-steppe rayons over deep chernozems and podzol-type soils mineral fertilizers in the following doses should be applied after all predecessors: after perennial and annual grasses 40-60 kg of nitrogen, 60 kg each of phosphorus and potash. After unfallow predecessors the norms should be increased by 20-30 kg of each element per hectare.

After better predecessors in the Polissya area, as well as Peredkarpattya and Zakarpattya 60-80 kg each of nitrogen, phosphorus and potash should be applied; after perennial grasses and pulse crops the nitrogen fertilizer dose is decreased to 15-20 kg per hectare. After unfallow predecessors, especially stubble, fertilizer doses should be 80-100 kg nitrogen and 60-80 kg phosphorus and potash per each hectare.

Full dose phosphorus and potash fertilizer application is recommended before sowing which will assure their maximal effectiveness. One-half of the nitrogen fertilizer is applied on 2 - 3 dates, in the sufficient moisture zone - a third of nitrogen together with phosphorus and potash, the rest as top dressing.

Rye, like wheat, is also sensitive to fertilizing. Therefore, full mineral fertilizer should be applied under it too, decreasing the nitrogen dose by one third to the recommended doses for wheat. Marked harvest increases from soil fertilizing are also provided by winter barley.

A highly effective method of utilizing fertilizer is its application to rows during sowing. After clean and spring occupied fallows a granulated superphosphate is applied--50-60 kg per hectare. After unfallow predecessors (and in the Polissya, Peredkarpattya and Zakarpattya zones also after occupied fallow) 100-120 kg of complex mineral fertilizer is applied.

Full Returns From Varieties

Agronomy and agricultural practice show that each farm should grow 2 - 3 mutually complementing varieties. This provides for more effective utilization of climatic conditions, soil productivity, agrotechnical background (predecessors, fertilizer, etc.).

The most productive, regionalized varieties of intensive type wheat resistant to loding should be allocated after better, fertilized predecessors. In the steppe zone they are: "Bezosta-1", "Dniprovs'ka-775", "Dniprovs'ka-846", "Odess'ka-napivkarlykova" and "Napivkarlykova-49"; in the forest-steppe--"Illichivka", "Polis'ka-70", "Kharkivs'ka-63", "Okhtyrchanka", "Kharkivs'ka-81" and "Karibo".

After unfallow predecessors more plastic varieties are allocated: "Odess'ka-51", "Myronivs'ka-808", "Erytrospermum-127" and others. In Polissya, Peredkarpattya and Zakarpattya "Myronivs'ka-808", "Polis'ka-70" and "Illichivka" are sown, and in the western rayons also "Karibo".

Use of the following diploid rye varieties has been expanded: "Kharkivs'ke-55", "Verkhnyats'ke-32", "Desnyans'ke-2"; tetraploid varieties include: "Belta", "Polis'ka tetra", "Ukrayins'ka tetra", "Zhytomyrs'ka tetra"; winter barley: "Oksamyt", "Orion", "Zympan", "Pamina", "Odes'kyy-46", "Start" and "Azher".

It should be remembered that intensive type varieties show their high productivity after application of varied agrotechnology which takes into account their biological specifics. Thus, varieties resistant to lodging require the application of higher doses of fertilizer; those which are noted for a lower tillering ability need larger sowing norms, they are also sensitive to sowing dates.

High-Quality Winter Crop Sowing

This year grain crops filled and ripened under complex weather conditions. Crop loding was evident over a considerable area, plants were affected by diseases and damaged by pests. Thus, special care needs to be given to providing winter crop sowing areas with high-quality seed.

In creating seed banks the following type of seed should be avoided: seed from lodged or root rot affected crops, black seed, damaged by false chinch bug, other pests or diseases. Seed should be very carefully cleaned and sorted to select fractions of filled and even seeds with high sprouting and germination potential. It is essential to treat the sowing material chemically in advance strictly adhering to technology. It is expedient to use seed air-sun warming.

Optimal sowing norms should be determined with consideration of concrete soil and weather conditions, predecessors, soil moisture, biological variety specifics, and methods and dates for sowing. According to scientific research data and production practice, the optimal sowing norm for intensive type winter wheat varieties on clean fallows is 3.5-4 million, after occupied fallows 4.5-5, after unfallow predecessors 5-5.5 million sprouting seeds per hectare; for more plastic varieties with an increased tillering ability ("Myronivs'ka-808", "Odess'ka-51"), after occupied fallows 4 to 4.5 and unfallow predecessors 4.5 to 5 million sprouting seeds.

Winter rye "Kharkivs'ke-60", "Kharkivs'ke-55", "Verkhnyats'ke-32" is recommended for sowing in the forest steppe zone and in Polissya 5 to 5.5 million sprouting seeds per hectare, in the steppe rayons 3.5 to 4.5 million sprouting seeds per hectare; "Belta", "Polis'ka tetra", "Zhitomirs'ka tetra" and "Ukrayins'ka tetra" varieties -- 4 to 5 million sprouting seeds per hectare.

In the steppe 3.5 to 4.5 million sprouting seeds of barley are sown, in the forest steppe 4 to 4.5 million sprouting seeds per hectare.

Seed of which a thousand grains weigh less than 30 grams should not be used for sowing. The sowing norm of seed weighing 32-35 grams per thousand grains but with a high sprouting and germinating ability should be increased against the recommended norm (according to the number of sprouting seeds per hectare) by 5 percent when sowing after better predecessors and by 10 percent after unfallow predecessors. When sowing later than the optimal dates (but within permissible limits) and with an increased seed covering depth because moisture is lacking in the sowing layer, the sowing norm is raised by 10-15 percent.

High-quality winter wheat seed should be treated with the TUR preparation only when sowing at the start of the optimal dates and in sufficient soil moisture.

To provide all farms with high-quality winter crop seed of regionalized varieties an interfarm and interrayon exchange should be held if needed.

In this year's conditions adherence to optimal sowing dates acquires special importance. A delay will lead to a lower field seed sprouting and sprout thinning, the plants will not have time to tiller and take root by the end of the vegetation period and to accumulate a sufficient amount of sugars, reserve substances, which will lower their winter hardiness. These crops are often thinned or die off completely during wintering, they must be overseeded or reseeded in the spring with spring crops which leads to a decrease in the gross grain harvest.

Optimal sowing dates have been determined for each zone and oblast of the republic, but they must be defined more accurately on each farm with due consideration of predecessors, soil moisture and variety biological properties.

It must be remembered that highly intensive varieties "Bezosta-1", "Dnipropetrovs'ka-775", "Kharkivs'ka-63", "Illichivka", "Polis'ka-70", and "Karibo" provide a considerably lower harvest if sown early. Optimal dates for plastic varieties: "Myronivs'ka-808", "Odess'ka-51" and others are of a longer duration.

Now about winter rye and barley. Too early sowing dates for rye, especially tetraploid varieties, lead to excessive development of the vegetative mass during the fall, also rotting, loding, disease and thinned crops. Triticale is very sensitive to late dates, and winter barley to too early sowing dates.

Timely and even sprouts of winter crops are greatly dependent on high sowing quality; it is essential that each farm prepare seeders ahead of time, determine the sowing norm, provide markers, and set up strict agronomical control. Special attention must be directed towards adherence to recommended sowing norms, depth and uniformity of seed covering.

On Irrigated Lands

Winter wheat occupies a considerable area among the grain crops on irrigated lands. With watering this crop provides a harvest of 50-60 and more quintals per hectare even during drought. For this reason it is important to provide for a timely and high-quality soil preparation and to conduct a moisture retaining watering with a norm of 700-1,000 cubic meters of water per hectare.

Harvest increase resulting from moisture retaining watering amounts, on the average, to 18 to 20 quintals per hectare. If the farm is not capable of conducting a moisture charge in full capacity, presowing watering may be utilized with a norm of 500-600 cubic meters of water per hectare, and in the tillering period in the fall--a vegetative watering can be done (400 to 450 cubic meters of water).

An essential condition for obtaining a high yield on irrigated lands is the application of a sufficient amount of fertilizer.

Winter wheat should be sown on irrigated lands on the following dates: in the central steppe in the second ten day period of September; in southern [steppe] in the second half of September; in Krym in the first ten day period of October.

Better regionalized varieties of winter wheat suitable for watered lands are: "Bezosta-1", "Dniprovs'ka-775", "Khersons'ka-153", "Erytrospermum-127", and "Odess'ka napivkarlykova".

All wheat on irrigated lands should be grown according to programming technology to obtain a harvest of not less than 60-70 percent grain per hectare from the whole area.

Creative application of scientific recommendations and leading experience with consideration of specific growing conditions of winter crops this year will provide an opportunity for village workers to establish a strong foundation for an abundant harvest in the first year of the 11th Five-Year Plan, and to meet the 26th CPSU Congress worthily.

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TILLING AND CROPPING TECHNOLOGY

ADVICE ON SOWING WINTER CROP IN UKRAINE

Kiev SIL'S'KI VISTI in Ukrainian 22 Aug 80 p 1

[Article by M. Khomenko, head of laboratory, Ukrainian Scientific Research Institute of Mechanization and Electrification of Agriculture, doctor of technical sciences: "Fall Sowing"]

[Text] This year a late fall and cool weather in the beginning of the summer delayed the harvesting of predecessors for winter crops. Therefore, the work must be organized so that fields allotted for winter crops are cleared first.

Considering the time needed for harvesting, the weed infestation of the area as well as soil moisture, leading farmers use a differentiqted method in selecting the most effective ways of field working and sowing. For example, on fields clear of perennial weeds, after row and pulse crops, they use mostly surface tilling which, compared to plowing, creates a better structure for the sowing layer, promotes moisture accumulation and retention, the appearance of even sprouts and a good development of winter crops.

After harvesting peas for seed and corn for silage the field is tilled with disk stubble mulchers and harrows. A good agrotechnical effect is obtained when the field is harrowed following harvest to a depth of 10-12 cm and the soil is packed with spiked rollers. Depending on weed growth, a second tilling is conducted across or at an angle to the direction of the first tilling. Along with this units with harrows are set in motion following the stubble mulchers to avoid soil drying out.

For better weed cutting and covering of nutrient remains disk batteries on stubble mulchers LDH-10, LDH-15 are set at a 30-35° angle and when BDT-7 or BDT-3 harrows are used at a 15° angle. Unit movement speed must not be more than 8 km per hour.

After each disk passage a groove-like furrow bottom is created. This has a negative effect on the work quality of seeder disk plowshares. Therefore, for levelling the area and creating a packed, smooth bed for the seed a presowing tilling must be done to the depth of seed covering utilizing KPS-4, and KPE-4 cultivators equipped with central shovels and toothed harrows.

In the central and southern steppe of the republic, where the soil's mechanical composition is primarily heavy and the sowing layer is often dried out, a good effect is achieved with the KPP-2,2, KPS-2,2 or KPSH-9 sweeps. The last one mentioned when used with three ton tractors must have two shovels (one on each side) removed. Units with toothed harrows HIH-3 are sent following the sweep, or, if the soil is not overly dry, a spiked roller.

High quality surface tilling is achieved with the anti-erosion cultivator KPE-3,8 combined in a unit with the toothed harrow HIH-3. It is attached to the cultivator with an intermediary link.

On slopes or fields with valleys ("depressions") soil surface tilling prior to sowing should also include chapping to a depth of 35-40 cm in the direction of the horizontals every 6 to 8 meters. A field with valleys is chapped lengthwise and crosswise with the distance between unit passages being 12-15 meters.

Areas infested with perennial weeds are tilled with well sharpened disk equipment in two directions to a depth of 10-12 cm following predecessor crop harvest. The root system of wheat grass and sow-thistle occurs mostly at this specific depth. As soon as the "small awls" of wheat grass and sow-thistle rosettes appear on the surface the field is immediately plowed with colter plowshares combined with spiked rollers. The soil is then prepared for sowing. For this reason only cultivators with spring sweeps are utilized in those fields.

The republic's machine operators have a lot of experience in the group working method. They select the sowing complex composition so that generally the pre-sowing soil tilling and sowing can be done on one field in one or two days.

Leading farms pay particular attention to working the fields prior to sowing. Because of this they increase the changeable output of the sowing units by 13-19 percent. Unit direction and method of unit movement is chosen so that in the spring, during winter crop root top dressing, the tractors can turn on end roads and not over the crops. Curved areas are sown first (their width is, as a rule, three unit lenths). The number of units is determined according to field size, relief and configuration. During drill and narrow row methods of sowing especially, and when two units are used, each of them begins work from the center of the field. Large fields are divided into sections according to the number of units. Seed drills must be equipped with two-way sound signalization.

If wheel tractors T-150K or MTZ are used during sowing, heavy harrows and chains are attached for soil loosening along wheel tracks. If this is not done crop shortfall, depending on unit composition, will amount to 2.5-8.6 quintals of grain per hectare.

The sowing quality is determined, as a rule, according to three basic indicators: the seed sowing norm, uniform depth of its covering, and the width of contact interrows. Work quality is the chief factor in sowing -- all those connected with growing wheat should concentrate on this.

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TILLING AND CROPPING TECHNOLOGY

RYE CROPS IN NON-CHERNOZEM ZONE DISCUSSED

Moscow SOVETSKAYA ROSSIYA in Russian 24, 25 Sep 80

[Article by B. Aitov, V. Mikhaylov, Ye. Nazarov: "The Rye Field"]

[24 Sep 80, p 2]

[Text] In Kalinin we witnessed the following conversation in a bakery.

"Do you have black bread?"

"What! Don't you see it? Here it is!"

"But this is grey wheat bread!"

"What kind do you want?! There's no other black bread!"

This was stated with invincible young certainty, and the person talking literally was rude to us. How sad it is that in the primordial Russian areas, many young people not only do not know the taste of rye bread, they also do not suspect that it even exists. Rye flat breads have become dainty dishes and in Moscow itself they can be bought in few bakeries and then only in the morning. In the majority of our cities rye bread is not baked at all: as a rule, rye flour in bakery recipes is a so-called drop in the bucket. Many have long come to terms with this. Frequently one can hear:

"What do we need black bread for? White bread is better!"

Unfortunately, the issue itself is not what is better or what is worse. It would be more proper to say both are good. In such a response there is more logic. Let us begin with the fact that people who are older have become used to rye bread from childhood. For them its absence is not only felt but is also a painful loss. Even from the standpoint of nutritional value rye bread is not in last place.

"If one takes 100 units of milk protein, the biological value of rye protein, according to the data of one of the foreign researchers, comprises 83 units. This is explained by the fact that rye contains more irreplaceable amino acids, particularly lysine and threonine," we were told by the head of the biochemical and microbiological laboratory at the All-Union Scientific Research Institute on grain and its byproducts, Doctor of Biological Sciences V. F. Golenkov. "For some reason everyone believes that white bread is incomparably more valuable. Dozens of large-scale scientific institutions are concerned with wheat. An Institute on Rice was organized. But a solid scientific center which would specialize in rye does not exist."

How did it happen that rye, which was almost the chief food for centuries in Russia, is now less distributed than foreign oranges? Let us turn to some statistical data. According to the results of the first four years of the current five-year plan, in comparison with the Ninth Five-Year Plan and even without it, the low average annual harvest of rye decreased on the whole in the Non-Chernozem Zone by 18 percent and in the northwestern oblasts by 26 percent. The Kalininskaya and Yaroslavskaya Oblasts and the Karel'skaya ASSR began to thresh rye during this period on half the annual average of the past, and in the Komi ASSR--less than half as much. In the oblasts where they have remained close to the achievements in the last five-year plan, there is no reason for jubilation. For example in Sverdlovsk during the Ninth Five-Year Plan as compared with the Eighth Five-Year Plan, the average annual rye harvest decreased by more than half.

In the state grain bins on the whole in the Non-Chernozem Zone, there is now one-ninth of the rye as compared to 1940. The average annual implementation of the plan for procuring rye during this five-year plan comprised only 52 percent, while in such oblasts as the Kostromskaya and Kaluzhskaya only 20 percent was carried out. In all the years of the five-year plan, from 29 of the Non-Chernozem oblasts and autonomous republics, the plan for procuring rye was fulfilled once in the Vologodskaya, Leningradskaya, Kaliningradskaya, Moskovskaya Oblasts, Mariyskaya ASSR and Udmurtskaya ASSR and twice in the Ivanovskaya and Ryazanskaya Oblasts. However, this was not the result of consistent work. For example, in 1976 Leningrad residents, in 1978 Moscow residents, in 1979 Ryazan residents sent only one-third of the amount stipulated in the plan for it to state granaries.

In short, rye harvests are steadily falling. What is being reduced--the harvest yield or the amount sown? Over the last 15 years the average harvest yield in the Non-Chernozem Zone increased by 1.5 quintals and during the current five-year plan it will comprise approximately 11.6 quintals of rye per hectare. The area used for this crop is being swiftly reduced: now there is only two-thirds as much as in 1965. We will attempt to understand from the beginning why from one five-year plan to another the plans for sowing rye are decreasing and why in the fall a portion of the field used for rye remains unsown.

"Rye has weaknesses. The chief one is that it yields 3-4 quintals less in comparison with the average harvest yield of grain," was the direct answer to our question given by the chief of the administration for agriculture in the Odoyevskiy Rayon of Tul'skaya Oblast, S.I. Zamarayev. "The more rye there is, the less the average total harvest yield of grain. It cannot be compared with winter wheat nor with barley. Barley now is particularly prominent. There are many new varieties, the change of strain goes more quickly, and we get more of a higher strain. Therefore, over the last four years the portion of barley sown in the grain structure increased from 29 percent to 39 while the rye sowing area decreased from 37 percent to 10 percent."

"Take, let's say, the Zarya Kommunizma State Animal Husbandry Plant of the Moscow Oblast," said the deputy chairman of the presidum of the department on the

Non-Chernozem Zone of VASKhNIL I. I. Letunov. "The harvest of grains per hectare was brought to 50-55 quintals, but they sow primarily wheat and some barley. If they become occupied with rye, they will have approximately no more than 35 quintals. Should they be accused of improper striving for volume? However the mass of protein is greater. Rye, it is true, has its advantages, and on a number of issues it cannot be replaced."

It is true, no matter how the selectors try, northern wheat more often produces grain which is good only for forage and for locally produced wheat flour used only as an additive. On the other hand, under all conditions rye preserves an adequately high bread baking quality. It also has other advantages over barley and oats. Spring droughts are not dangerous to it and rye can be harvested and sown during other times. Therefore, equipment is used more equally. In this respect winter wheat has approximately the same favorable quality, but rye is superior in its winter tolerance. This is very important.

Each spring on the average, 16-17 percent of the winter wheat sown is lost, but for rye it is two times less," stated the chief agronomist of the department for grain production and general issues concerning farming of the RSFSR Ministry of Agriculture A. I. Ivanov. "If one counts how many seeds are lost on replowed wheat fields, the actual difference between the harvest yield of rye and winter wheat will be significantly less than usually believed."

It is also important that rye thrives in extremely poor soil, including light and sandy soil where wheat yields nothing; without rye it is impossible to use all of the resources of the Non-Chernozem plowed area. Deputy chairman of the presidium of the VASKhNIL department on the Non-Chernozem Zone, G. V. Blagozeshchenskiy, expressed a thought about this.

According to the opinion of many scientists, the Non-Chernozem belt of Russia should become a granary of rye. For this it is necessary that sowing, primarily of rye, reach 9-10 million hectares, that is increase the sown area as compared with the harvested area of this year by 2.5 or 3-fold. Moreover, winter wheat must occupy a secondary position and it would be advisable to distribute it to the southern regions of the Non-Chernozem Zone, south of the European section of Russia. In reaching this conclusion, the authors of the book WINTER RYE AND WHEAT IN THE NON-CHERNOZEM BELT, doctors of agricultural sciences P. V. Dnisov and M. F. Stikhin again and again repeat:

"In the Non-Chernozem area, winter rye can grow in any year (during cold ones and during dry ones) and yield high stable harvests."

High and stable, but...after all not higher than the harvest yields of winter wheat, barley and oats. One cannot avoid this fact. It shows and will continue to show its influence. What is one to do? Apparently, under similar situations, the planning organizations should show the maximum sternness: they should not allow any more reductions in rye fields. National and state interests must be placed first.

"I would also consider it necessary to increase the material interest of the farmers in raising rye and to consider in the procuring price that its harvest yield is lower than other grain crops," expressed the chief of the agricultural administration in Semenovskiy Rayon, Gor'kovskaya Oblast, A. G. Kanashenko. "In my time rye was exchanged for combined feed at a proportion of 1:1.4. Now this does not exist. In the current five-year plan there were years when we had to release up to half of the rye harvest for forage. This was not businesslike, but what was to be done?"

Of course, pure administrative influences and additional material stimuli, despite all their effectiveness, do not in and of themselves resolve anything. There are other problems which also require attention and consideration. The following letter deals with this.

[25 Sep 80, p 2]

[Text] In the past, Nemchinovka was a village on the outskirts of Moscow. Now the Scientific Research Institute of Agriculture for the central rayons of the Non-Chernozem Zone is here. We are speaking with A. A. Goncharenko who is the head of the laboratory on winter rye and the creator of the Voskhod-1 and Voskhod-2 varieties on which, along with the Bashkirskiy Chulpan variety, a great deal of hope is being placed: they are capable of yielding 50-60 quintals of grain per hectare.

"That is true, planning measures as well as material stimuli are needed," agreed A. A. Goncharenko, "but in order that the problem be resolved radically, winter rye is necessary which would not be inferior in harvest yield to other crops. Here we have a breakdown and in the selection of winter rye we have fallen behind. For example, Chulpan still splinters and it is necessary also to work at my varieties. However, this is not the biggest slowdown. For us it is easier to create a variety than it is to put it into operation. This is the problem. Experienced farms of the Nemchinovka Institute and Tolstopal'tsevo are not seriously occupied with the proliferation of Voskhod, and their leaders feel that for them it is important to raise the average harvest yield of grains. It is like stepping up the spring which would and did add to the viability of the new variety. Here is its beginning, its source and primarily from here should the elite seeds come. We do not have a clear system which would provide for the advancement of new varieties for sowing. From a material standpoint this process is also not stimulated."

Subsequently, we become certain that Goncharenko's seemingly sharp criticisms were correct. A clear system for seed raising of winter rye exists bascially on paper. Let us at least visit once more the Odoyevskiy Rayon of the Tul'skaya Oblast. Its leaders insist that the Kolkhoz imeni Krupskaya specializes in the seed raising of grain crops. This specialization, however, boiled down to the fact that a sign was changed: the harvest yield in recent years here was lower than the fairly humble average rayon indicator. Who will buy the seeds if they guarantee retardation? They are not taken from here. Each farm gets its seeds independently. But can one get a lot outside? Only some crumbs. By the time they multiply, years will pass and the strength of the variety will be lost. What is the result? The result in the rayon is that more than half of the rye fields have been sown with seeds which have less than a fourth reproduction. Now the Odoyevskoye Agroindustrial Association looks after grain crop seed raising. But here also the harvest yield was not high enough.

Obstacles in the way of the new varieties, as you see, are many and they are not overcome with enough energy, yet in the RSFSR Ministry of Agriculture, there is an optimistic attitude.

"With the appearance of such wonderful types of rye as the Voskhod-1, Voskhod-2 and Chulpan, although they have not been perfected, the harvest of rye will increase," Deputy Minister B. P. Martynov assured us.

We will wait with doubts and we will agree with this prediction: it has its foundation if one deals only with the distribution of the new varieties. However, is it possible in a short period of time to change rye, even if seed growing goes better, from a poor and beaten "cinderella" grown on poorest soil into a beautiful bride which any prince would be happy to have? Do not the ministries simplify the plan for advancement?

The Kuvshinovskiy Rayon of the Kalininskaya Oblast.

"We have tried many new varieties: Belta, Teta Leningradskaya, and Gibrid-173," the First Secretary of the Rayon Party Committee V. N. Vasil'yev said bitterly. "In 1976 almost the entire rye field was sown with Belta. In the fall the sowing was wonderful, but in the spring we came and looked and almost two-thirds of the sown area had to be plowed again. The harvest yield was reduced to one-third. In 1978 against our will it became necessary to return to our own Vyatka-2, although in our oblast it had been removed from the district and its primary seed raising was stopped. They sowed seeds of mass reproduction and still gathered the highest yield in this five-year plan harvest. No, we have not taken everything from Vyatka, what it is capable of and as a variety it did not exhaust itself."

Does it turn out that the scientists are mistaken? Do their varieties not withstand the experience of production? No, it is all the same incident when both are correct.

"Vyatka lodges well, the harvest is extended and since rye tends to shed, we lost a large portion of the biological harvest," remembered the chief of the administration of agriculture in the Rzhevskiy Rayon of the Kalininskaya Oblast N. S. Natertyshev. "Therefore, actually, we became involved with new varieties. Belta at first gave up to 30 quintals! How can one help but become involved! Then we were convinced that for winter durability the new varieties should give way to Vyatka-2. They were demanding, frequently capricious, and intended exclusively for good agricultural areas. But our land is meager and too moist. Our sowing areas are not prepared for raising intensive varieties. For us Vyatka is modest and indulgent in our mistakes and shortcomings. Thus far..."

Consider the phrase: thus far. Actually on the farms where soil productivity is better, the relationship to varieties is different.

"I agree that in a number of western rayons in our oblast, where there are many sandy and poor soils, it is too early to refuse Vyatka. But we do not need it," noted the Chief of the Agricultural Administration of the Kalininskiy Rayon of the Kalininskaya Oblast S. M. Belyayev. "We sow Belta, Gibrid-173 with difficulty but we obtained Voskhod-1 and last year Chulpan was delivered."

The Kalininskiy Rayon is practically the most developed one in the oblast and the crop of the farmers here is better and the interest in intensive varieties is relatively greater. On strong farms one can observe a tendency to cultivate highly intensive varieties. But on weak farms they are tied to Vyatka-2. Although the harvest is not great, it is guaranteed. As though supporting this position, department chief Yu. I. Mitrofanov of the All-Russian Scientific Research Institute of Agricultural Use of Reclaimed Lands stated: new varieties are not adequately winter hardy and it is too soon to refuse Vyatka. In my opinion the variety experiments themselves here are not done properly. New varieties are checked only in good agrarian conditions, and it would be essential to observe how they behave under real circumstances where they would be found on average and weak farms.

Hearing this criticism, A. A. Goncharenko, who is already familiar to us, at first thought a bit. The presentation of the issue was new to him.

"They are right that Vyatka remains the most winter hardy and stable variety," he admitted. "It is true that our varieties require better agrarian conditions and more care. This means that it is necessary to improve agrarian conditions. What, should I orient myself towards backwardness?"

In the RSFSR Ministry of Agriculture they are more decisive in their orientation towards new varieties and many do not want to har about Vyatka-2.

Let us think a bit. Let us imagine that in some factory they decided suddenly to double the production output. What would the director then say? He would demand either that the production area be increased or to have more productive equipment. And in agriculture? In agriculture we at times wait for everything to be ready in one year, by moving a magic wand and the only requirement is a little effort. Moreover, highly productive plowed areas also must be built and often also developed since there are no two identical fields. If one desires to do it, it is possible ahead of time to calculate where, when and in what period of time this or that farm will have the condition for creating intensive varieties and when leaders can require of it qualitative achievements; however, for this it is not at all necessary to know about agriculture at all, but each farm with all of its particular features. Determining where some varieties should be used more appropriately also excludes a volume approach.

"Now in our oblast they are sowing basically the Khar'kovskaya variety of rye," the Director of the Gor'kovskiy Agricultural Experimental Station T. S. Khayrullin shared with us. "For the oblast which is divided into two sharply different climatic zones, having one single variety is unforgiveable. But where is a better variety? They brought Chulpan to us: some praise it others criticize it. Who is correct? The capital scientific institutions do not answer this question and the oblast experimental stations cannot be everywhere in time."

The unjustified running ahead, unfortunately, is felt not only in the comparative evaluation of varieties. It is even more obvious in determining what should precede winter rye. It is one of the key problems. Yes, rye is capable of giving a guaranteed harvest, but only by adhering to a number of agro-technical rules. In particular, the future rye field is plowed by good farmers about three weeks prior to sowing in order that the soil has time to settle and would later not tear the new roots of the sown seedlings. It is important to sow rye in time, and no earlier or later than the optimal time-frames but these time-frames are narrow: only some five-six days. If, as it often happens, winter rye precedes barley, do its maturation and harvest become extended over a longer period of time? Then sowers must be put into operation almost immediately after plowing. The sowing is done outside of the optimal time frames. The rye does not have an adequate amount of time to gather strength prior to the snow and it is difficult for it to withstand the severe struggle with frost.

How can that agro-technical minimum be provided which makes rye practically independent of good or poor weather?

Working with these observations, we travelled a great deal, saw rye which was both light green and in full bloom as well as the proud silvery color of maturity. In all stages the rye field casts a spell and attracts one to it. There is something in it of great harmony and it always resembles chords of triumphant, spirit-lifting music. One field was particularly memorable. The rye was relatively low, but just as choice, with large full ears and no sparse spots.

"The rye is good?!" The chairman of the Bor'ba Kolkhoz of the Kalininskaya Oblast Ye. I. Artem'yev, who brought us here, said as he looked around with pride. "By the way, the year before last here in the middle was a swamp. Rocks were everywhere. There were bushes on the edge of the field. Even pine trees were there. For a long time I have wanted to change this field, but I was never successful: I was always busy with sowing and it was impossible to enter it. Last year they allowed 15 hectares to remain fallow, and here there are 35. Thus, we added to the fallow field the hectares needed by the administrative decision. Everything was done properly: the bushes were cut, the swamp was drained, extra manure was brought out, and the plowing was done early. This is good grain and nothing will interfere in its growth. On a clean field we get no less than 20-25 quintals of rye per hectare and on an occupied one we get no more than 15-17. This is not all the benefit from a clean field. Now we have sown clover here and next year it will yield 50 quintals of hay per hectare. And then no matter what is sown here, the harvest will be excellent. For seven years the entire crop rotation in the field has been fertilized."

Almost everywhere that we visited the conversation turned to the fallow fields. In the Ustyuzhenskiy Rayon of the Vologodskaya Oblast, as the First Secretary of the party rayon committee L. M. Vlasov told us, they achieved a stable harvest of rye to a great extent because of the skillful use of cleaned fields.

The approach to this issue must be scientific and creative. Individual farms in the rayon refused the cleaned fields, but did it themselves without being urged on, when they prepared the fields for a double load.

In our letters we investigated the issue over which arguments are going on and thus far not a single opinion has developed. But this is not all which leads to the scarcity of rye fields. As was stated, rye, more than other grain crops, is inclined to shed during extended harvesting and 40-45 percent of the biological harvest goes back into the earth. Moreover, the seasonal load for the grain combine in the Non-Chernozem Zone is still high. Rye must be sown only with seeds which were threshed last year, but the stock turned over this year covers no more than 18-20 percent of the requirement. The grain must be practically poured from the combine bunker into the sower and such seeds have not yet gathered the full biological strength and will never yield a high harvest.

The sowing of rye coincides with reaping and in flax sowing areas it is even done along with flax pulling. At this time they begin to gather vegetables and the procurement of seeds continues. The agronomist and leader sometimes do not have enough time to even look at the future rye field. In combination with the cool attitude towards rye this also has a negative influence upon the state and condition of its sowing. This year, for example, the sowing again has been inexcuseably long.

This means that again the planting will be scarce and late and again the harvest will be small.

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TILLING AND CROPPING TECHNOLOGY

DEVELOPMENT OF POTATO CROP, MINIMIZATION OF LOSSES

Kiev SIL'S'KI VISTI in Ukrainian 21 Nov 80

[Article by P. Luzan, honored Ukr SSR agronimist and V. Kalyta, SIL'S'KI VISTI special correspondent: "Potatoes--A Crop for All Zones"]

[21 Nov 80, p 2 Par I]

[Text] Culinary experts report that more than 100 different dishes may be made from potatoes. Perhaps they exaggerate a little. But one thing is certain: this fruit of our soil is rich in carbohydrates. And scientists have determined that their protein nutritional value is even higher than in wheat -- the tubers contain many amino acids which are essential for humans. Potatoes are also a good feed for farm animals and good raw material for the processing industry.

In nutritional value, three quintals of potatoes equal almost a quintal of oats. Thus, a 300 quintal tuber harvest would equal to 90 quintals of grain. We can only dream about this type of oat harvest per hectare. And 300 quintals of potatoes? This limit was reached by quite a few brigades and even whole farms.

Unfortunately, not everyone treats this crop with the attention it deserves. Every year many kolkhoses and sovkhoses lose a considerable amount of their potato harvest. How do leading farms and potato experts realize the high potential of this crop? What must be done for the republic's kolkhoses and sovkhoses to attain a new, higher step on the road to increasing the output of this valuable production in the 11th Five-Year Plan?

We will start with a brief excursion into the past of potato growing. For several decades tuber yield on the republic's farms remained on the same level, between 90-100 quintals. After the March (1965) CC CPSU Plenum substantial changes occurred in the development of this branch. Procedures requiring the most expenditure of labor, such as soil preparation, planting, crop care and harvesting began to be shifted to machines. Crop growing technology was being perfected.

In the years of the past and present five-year plans a new virus-free system of seed growing was introduced, developed by a group of specialists under the direction of prof. O.I. Onyshchenko. Specialized, so-called closed rayons and zones for crop seed growing were established in the republic. A scientifically proven system of variety renewal has been introduced widely.

Closed seed growing rayons together with scientific research institutions began producing seed material on a fundamentally new basis. Already in 1975 they provided the farms with 340 thousand tons of high-quality seed stock, and in 1979 this number increased to 510 thousand tons.

As in beet growing, a movement has started among potato grower tractor operators to convert the branch to an industrial basis. Noticeable improvements have occurred: tuber yield in the republic for the years 1976-1978 compared to the Eighth Five-Year Plan increased on the average 1.3-1.4 times. Yet the crop harvest potential was far from fully realized.

The instructive experience of the Chernigov area testifies convincingly to the inexhaustible reserves of the potato field. If in the Eighth Five-Year Plan an average of 104 quintals of tubers per hectare were harvested here, then in the ninth -- 140, and in 1979 -- 198 quintals. As we can see, each hectare planted began "working" almost for two over the whole crop area.

In 1978-1979 the oblast attained first place in the republic in the gross potato harvest (191 quintals). One hundred and eighty seven kolkhozes and sovkhozes here went above the 200 quintal margin, and on sixteen farms the harvest reached above 300 quintals.

At the kolkhoz imeni Sverdlov in Chernigovskiy Rayon last year 370 quintals of tubers were grown on each of 270 hectares, at imeni Frunze, Gorodnyanskiy Rayon -- 355 quintals, "Avanhard", Koropskiy Rayon -- 345 quintals. Those and a number of other farms show their achievements at the VDNH USSR and VDNH Ukr SSR [Exhibits of National Economic Achievements].

Potatoes became a crop for tractor operators in the oblast. More than 1,140 specialized teams grow them, utilizing tractors, plows, cultivators, planters, combines, sorting points and other technology. The well-known masters in the republic, heroes of socialist work O. Ya. Dmytrenko from the kolkhoz "Vsesvitniy Zhovten'" and M.M. Rebenok from "Avanhard", Chernigovskiy Rayon were pioneers in introducing complex mechanization and progressive technology. They are also the initiators and teachers in the introduction of the new and progressive mechanized teams in the oblast. For example, at O. Ya. Dmytrenko's team base a school for leading experience in potato growing was established, and at M.M. Rebenko's -- a republic Komsomol youth group. But possibly the greatest service performed by party organizations, soviet, agricultural oblast organs and the oblast research station is in making sure that outstanding achievements and work methods of experts become the achievements of all potato growers.

They did not end with this. Along with increasing the skill of the machine operators, they also provided a promising basis for its application. Chernigov area residents wisely undertook to raise the fertility of soils poor in nutrient content, working for a more effective utilization of drained lands which did not yield appropriate returns in the past. It became a rule for agronomists to utilize each ton of organic fertilizer and each quintal of mineral fertilizer as expediently as possible. Limestone material and gypsum have been put to use also.

Let us turn to statistics. If in the Eighth Five-Year Plan an average of only 8 million tons of organic fertilizer were applied within the oblast, in the ninth it was 11 and in the tenth 15 million tons. Today 70 tons of manure and 10 quintals of mineral fertilizer are applied per hectare.

Purposeful work in improving seed production provides a good foundation for oblast potato growing tractor operators. Centers were established in four specialized rayons -- Menskiy, Chernigovskiy, Koropskiy and Sosnitskiy. They furnish highly productive seed for variety renewal.

"But that is true in the Chernigov area, in Polissya," some of the more southern forest-steppe farm managers say, "Our conditions are quite different..."

Let us assume that it is more complicated to obtain high tuber yields in the Poltava and Kharkov areas. There is less moisture in the soil. It is difficult to use combines over compacted soils and manual labor has to be relied on during harvesting. This "technology" is quite costly; it is not by accident that many farms in the forest-steppe find potato production unprofitable. Yet, if a desire exists...

I. M. Kolisnyk, brigade leader of the second complex brigade at the kolkhoz imeni Shevchenko, Mirgorodskiy Rayon, Poltavskaya Oblast, tells the following: It was thought at his farm also that it would be impossible to utilize combines over their heavy soil. The machine would not be able to separate the tubers from soil clods so that during harvest, in addition to members of plowing teams, other help had to be included. But already this year I.S. Pokitko's mechanized potato growing team worked like a clock. Women workers did not have to help as before.

Help also came from scientists at the Ukrainian Scientific Research Institute of Potato Farming. Using farm agreement principles, they undertook the development of a technology of mechanized tuber growing and harvesting on compacted soils. Some elements of the new technology were introduced at the kolkhoz imeni Shevchenko already this year. Scientists suggested using a rototiller cultivator with vertical type working organs assigned to massive pre-planting rototilling and crop inter-row working. Through its use more moisture was retained in the soil and clods which continuously hindered mechanized harvesting were eliminated.

Weather conditions this year were certainly unfavorable for potato growing and yet machine operators from I.M. Kolisnyk's brigade at the kolkhoz imeni Shevchenko harvested 120 quintals of tubers per hectare. This is almost two times more than in areas where old methods were used. Apparently there are reserves for branch improvement in the forest-steppe.

Let us return to the technology being developed by the institute. Its application offers promise. It provides for high-quality pre-planting soil preparation. This may be achieved through rototilling equipment, planting with ridge formation or into previously cut ridges, diligent care, avoiding clod and block formation, and appropriate pre-harvest soil preparation.

Of special interest is a soil preparation variant which provides for fall sweep equipment use along with spring pre-planting tilling followed by inter-row working with the aid of active vertical type working parts. Analysis has shown that only one soil rototilling provides for a 10-15 percent harvest increase. On the whole, this technology, which still needs to be worked on and improved, opens possibilities for mechanizing all laborious processes, sharply decreasing losses and expenses per production unit. But, most importantly, it lets the combines roll over the fields, which was considered a "narrow" spot in potato growing in the forest-steppe and steppe zone up to now.

If this technology improvement were combined with appropriate care for increasing soil fertility, seed growing and crop variety composition, as it is done by the Chernigov area people, it would be possible to attain the 200 quintal harvest margin even in the forest-steppe.

The south of the republic has to be discussed separately. It has long been considered a non-potato zone. There is some basis for this, it is a dry area. But a lot of water has come to Tavriya. The yield rose, but not as sharply as could have been expected. Only 60-70 quintals of early potatoes were harvested. What was the reason? There were two basic reasons.

The first: Southern kolkhoses and sovkhoses did not supply themselves with sufficient high-quality planting material of the early ripening varieties. The second: Traditional technology was found to be unsuitable for the local soil-climatic conditions and crop biological specifics.

The problem is being handled by workers at the laboratory for southern potato growing of the Ukrainian Scientific-Research Institute of Irrigated Agriculture, headed by hero of socialist labor, candidate of agricultural sciences M.S. Boyko.

Scientists there have developed a new, industrial technology which resulted in a harvest of 200-250 quintals on irrigated lands as opposed to 60-70 quintals. It provides for correct variety selection with different ripening dates and for growing of own, high-quality seed of early ripening varieties from summer planted freshly harvested tubers; substantial improvement in the soil working system so as to create and preserve a loosened, small clod structure in the plowing soil, avoiding large clod formation; using a programmed, scientifically grounded fertilizing system providing the soil with organic substances, and chemical land reclamation of local saline lands, etc.

Even today a number of southern farms grow harvests which may be envied in the Polissya area.

Here is a specific address: kolkhoz "Ukrayina", Kakhovskiy Rayon, Khersonskaya Oblast, where in the last few years, regardless of the weather, more than 200 quintals of tubers per hectare were harvested. A similar margin was also attained by kolkhoz imeni Lenin, Golopristanskiy Rayon, "Lymans'kyy" sovkhoz, Beloserskiy Rayon, and a number of other farms in the oblast.

Soil preparation work [in the above] has been moved to the fall season. In the fall the fields are plowed, cultivated, ridges are cut and fertilizers are applied.

A lot was gained by this. Spring use of heavy machinery and equipment, their many passages over the field packed the soil considerably, destroying its structure, and forming large and small clods. This, in due course, not only prevented the potatoes from realising their harvest potential, but also hindered combine field work so that they were hardly ever used for harvesting purposes; even potato diggers remained away from the fields. There was one more "minus" to the traditional technology: the soil on irrigated lands ripened slowly in the spring and this delayed the dates of pre-planting field preparation and tuber planting.

In the Kherson area, an oblast school of leading experience in potato growing on irrigated lands was established at the Kakhovskiy kolkhoz "Ukrayina". It was not too difficult to promote this promising crop for the south, each crop hectare brought the farm almost 2,000 rubles in income. What else could be this profitable?

The technology proposed by the scientists has spread widely within the republic. This allowed for a marked improvement in supplying the population with a valuable nutritional product, not brought into the republic, but their own. In the Kherson area twice more early potatoes were procured in the present five-year plan than in the past five-year plan.

Thus, there are reserves for branch improvement in the Polissya area, in the Forest-steppe and in the Steppe Zone. The problem lies in a more energetic and active approach as required by the decisions of the October CC CPSU Plenum which provided important goals for rural workers in the new five-year plan.

The time has come to find and utilise not only those reserves which are obvious, but also those which require more effort, to learn how to grow our second bread not only in favorable weather conditions but also in complex years such as this year seemed to be. It proved to be a serious test for potato growers, and taught farm managers and specialists, scientists and all others connected with the branch many things. This will be discussed in the next article.

[22 Nov 80 p 2 Part II]

[Text] This year weather conditions seemed completely unfavorable for the republic's potato growers. The following is an excerpt from a report by specialists: "Tubers were planted 15-20 days later than normal. Because of a lack of warmth all phases of plant development occurred with the same delay. Low temperatures and frequent precipitation caused a disturbance in plant physiological functions, as well as disease occurance and washing out of plant nutrients from the soil. Weak stalk development led to a slower than normal accumulation of the tuber mass..."

In this, one might say, extreme situation winners were those who adjusted to the situation along the way, who applied agricultural measures creatively, and introduced recommended technology with flexibility.

Kolkhoz "Avanhard", Koropskiy Rayon, Chernigov area, might serve as an example. This kolkhoz participates in the VDNH USSR and VDNH UkrSSR. In the last ten years, compared to the previous, total gross tuber harvest increased here from 42.9 to 76.3 thousand tons, the average yearly yield was increased from 160 to 282 quintals, production sale to the state increased almost twofold. State procurement plans are continuously overfulfilled. What are the reasons for this success? They are thoughtful care for increasing soil fertility and consideration of concrete conditions which occur.

The farm potato crop occupies 300 hectares. This equals 17 percent of arable land. The fields are manured well, an average of 22 tons are applied per hectare, and 70-75 tons of composts per hectare immediately under the potatoes. In addition to organic fertilizer, 12-13 quintals of mineral fertilizer are also used.

Seed growing is of high quality also. Planting material is stored in standard storehouses. All 300 hectares are planted with seed of better regionalized varieties — "Hatchyns'ka", "Temp" of the first and second reproduction.

The kolkhoz does not permit carelessness in applying recommended technology.

"We try to approach the methods of tuber planting in a differentiated manner," states Oleksandr Hryhorovych Borovyk, head of the administration and an engineer by profession. "In years with sufficient soil moisture, we utilize the ridge or half-ridge methods, and ordinary methods during droughty years. Planting is done within specific dates, in ten-twelve days."

Those who visited this kolkhoz did not see any weeds in the fields. Rural workers were able to grow an abundant harvest even in this year's unfavorable weather conditions, almost 200 quintals of tubers from each hectare, selling the state 2,300 tons when the actual plan called for 2,100 tons.

How did they achieve this? Through flexible technological tactics. In this year's moist conditions they used the ridge method of planting potatoes. When the rains started, they did not rely on herbicides, but combined chemical field weeding with mechanical, assuring clean crops and interrow soil loosening. This was very important for this year's harvest when favorable conditions developed for weed growth.

Specialists know that in a moist year late blight may be expected over extensive potato crops. One or two crop workings are not sufficient, at least five-eight are needed. This was done at "Avanhard" and 30-40 quintals of tubers were saved on each hectare.

Oleksandr Hryhorovych Borovyk calls attention to one more fact: tuber picking after combine passage was organized at his kolkhoz as usual. This provided more than 30 additional quintals of production per hectare.

This year proves that a good harvest was achieved by those who applied no less than 60-65 tons of high-quality spreading manure per hectare, who correctly evaluated the danger of late blight and worked the crops not one or two times as practiced under normal conditions, but four-five times, taking into account that fertilizer is washed away by rains, and who also applied potash and nitrogen fertilizer prior to potato sprout appearance. Those farms were among the winners who evaluated correctly the danger of field weed infestation, where herbicide application was combined with mechanical weeding. The need for this was evident in the spring — herbicides, pre-sprout crop harrowing in many instances did not "work", weed sprouts appeared on the fields of many farms.

"In these conditions, as never before, early pre-sprout potato ridging proved to be very effective for us," states L.N. Sukhomlinov, deputy head of the Chernigovskaya Oblast agricultural administration. It was effective at the kolkhoz imeni Lenin in Gorodnyanskiy Rayon. An oblast seminar was held there. Machine operators quickly assimilated the principle of cultivator reconstruction, applying the simple agricultural measure widely. They were not mistaken. In unfavorable weather conditions the kolkhoz imeni Lenin harvested more than 150 quintals of tubers per hectare. Neighboring kolkhozes imeni Zhdanov, Illich and others, where pre-sprout ridging was not practiced or was done with a delay, harvested a third less.

This is understandable. According to data from the Ukrainian Scientific-Research Institute of Potato Farming covering emerging weed shoots with soil causes a reduction and destruction of shoots of most types of weeds, decreasing Colorado beetle egg deposits and larvae found on plants. In this high moisture year this measure outside traditional technology promoted also the formation of an additional bed of stolons and tubers, and lowered the level of plant soaking.

It appears that flexibility and operativeness in technology and a differentiated approach can achieve quite a lot. This is confirmed by the experiences of the following kolkhozes: "Pershe Travnya" in Sarnenskiy Rayon, Rovenskaya Oblast which this year grew 208 quintals of tubers per hectare, "40-Richchya Zhovtnya" and imeni Chapayev, Glibotskiy Rayon, Chernovitskaya Oblast where 161-163 quintals per hectare were harvested and many other republic farms as well.

There were also unsuccessful experiences.

This year's lessons will force potato growers, practical workers and scientists to a deeper and more qualified consideration of the further development of an important branch, to a more decisive attempt at solving the problems facing potato growing today, on the threshold of the new five-year plan.

One area might be the determination of correct variety line. It is nice to note that in the last ten years the potato variety composition in the republic has almost completely renewed itself. Many new ideas became part of production aimed at obtaining 200-300 quintals of tubers per hectare. But, as the weather situation indicated this year, the time has come when production cannot be satisfied with only two traditional characteristics of varieties grown — high yield and taste qualities. Life is demanding from plant breeders the creation and delivery into production of varieties which would be even more resistant to disease, especially to late blight, and to unfavorable conditions in the external environment.

Storage of seed tubers remains a problem area in branch development. Experience shows that substantial storehouses must be available. Planting material losses are two-three times smaller in them. Tuber sorting and warming may be started in them before planting already at the end of February and thus may be finished and planted on time. If there is no storehouse available and sorting is started outside when it turns warmer, planting is stretched out to 20-30 days instead of 10-12 as recommended by science.

Construction of potato storehouses amounts to additonal expenses. But, as leading farm experience shows, these expenses pay for themselves in two-three years, and not only with additional harvest. The need to transport 400-500 tons of straw from the southern oblasts (where local straw is insufficient) will no longer be necessary. This also amounts to a nice sum saved.

The present year has confirmed how important it is to arrange everywhere for promising protection of plants from diseases and pests. We cannot rely on one-two chemical treatments against late blight in years with frequent precipitation, the spraying frequency should be much greater. In these conditions above-ground plant protection equipment will not always provide the needed result. Thus, the problem of utilising aviation is quite urgent (as practiced, for example, in viticulture), first of all for closed seed-growing rayons. Experience confirmed that use of helicopters and planes is much more effective than above-ground means, especially in moist years.

Harvest loss elimination is a large reserve in potato growing. Substantial harvest shortfalls are allowed during harvest. At the Chernigovskaya Oblast agricultural research station the following experiment took place: combines were used after potato diggers and harvested 32 additional quintals of potatoes from each hectare.

On a number of farms losses permitted during harvest are multiplied in transport. After numerous transfers, careless production handling, the consumer obtains "bruised" potatoes with a darkened pulp and a considerably lowered nutritional value. The problem of container transfer is becoming more urgent.

Branch workers are expecting the industry to provide improved machines and equipment for soil tilling, planting, field care and for harvesting the crop.

The following refers to closed seed-growing rayons. In each of them there are one to two farms of the first group on which oblast research station bases and hothouses were set up. Here the super-elite and elite are grown on a virus-free basis for transmittal to farms of the second group. Unfortunately, these plant-breeding seed-growing complexes are not yet fully utilized. The hothouses which were constructed for primary seed-growing are inactive in some areas because of insufficient fuel. For some reason, State Planning and the Ukrainian Ministry of Agriculture decided to economize on plant-breeding and seed-growing.

Specialists state that it is essential to organise manure supply to potato sowing farms. For example, the Polissya and western oblasts of the republic are allocated a ton of mineral fertiliser both for leading farms which grow 200-300 quintals of potatoes per hectare and for those farms which harvest three times less. Yet, nourishment removal from the soil is different, not in favor of leading kolkhozes and sovkhozes. Is it not time to review this practice, utilizing an improved differentiated system which would consider the farm potato harvest?

Seed control for the level of seed virus contamination has not yet been well organized in closed rayons. There are cases where seed kolkhozes are growing seed other than the varieties needed for planned variety renewal in the zone they serve. The "Sortnasinovoch" Association, whose network procures variety seed potatoes, is not yet fully concerned with the quality, limiting its functions to procurement.

Closed seed-growing rayons are a singular standard in the farming culture of this branch. Many of them meet this requirement fully. But, unfortunately, even among them there are instances where the potato harvest potential is not fully realized. Let us take the specialized farms in the closed seed-growing rayons — Chernigovskiy, Menskiy, Koropskiy and Sosnitskiy in the Chernigov area. Here 200-300 quintals of potatoes are harvested per hectare every year. Next to this there is the Chernobilskiy Rayon, also specialized, in Kievskaya Oblast, where the average harvest during the last four years amounted to only 133 quintals.

What is the general picture within the oblasts? In the Chernigov area: In the past five-year plan an average of 141 quintals of potatoes were harvested per hectare, in the four years of the present five-year plan 36 quintals were added. The neighboring Zhitomirskaya and Kievskaya Oblasts do not go above the average level of 116-130 quintals for almost ten years now. One more branch reserve lies in the liquidation of this diversity.

Potato crop allocation to crop rotation fields should be considered seriously. Haste should not be allowed in concentrating crops on farms where essential conditions are lacking for a guaranteed high and steady yield.

In particular, more preparation is needed for commodity crop allocation in the suburban zones of Kiev where, stating plainly, things are not quite right with the Kiev city and rayon fruit-vegetable trade in their task of supplying the population with high-quality potatoes continuously.

All of these problems merit the attention of the Ukrainian Ministry of Agriculture, Ukrainian Ministry of Sovkhozes, the Southern Section of VASKHNIL and the Ukrainian Scientific-Research Institute of Potato Farming.

The people consider potatoes as their second bread. Scientists call them a botanical masterpiece. Therefore, attention to them should correspond to their place in crop rotation.

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TILLING AND CROPPING TECHNOLOGY

FERTILIZER APPLICATION IN KIRGHIZ SSR DISCUSSED

Frunze SEL'SKOYE KHOZYAYSTVO KIRGIZII in Russian No 10, Oct 80 pp 16-17

[Article by N. Korneva, chief of the division for agrochemistry of the Kirghiz Scientific Research Institute of Farming, doctor of agricultural sciences, and R. Dzhekshembayev, chief of the republic agrochemical laboratory: "Fertilizers with Basic Cultivation of the Soil"]

[Text] A considerable proportion of the annual volume of fertilizers is applied with fall plowing. This device has come to be called basic fertilization. This is because a large part of the fertilizers (two-thirds) is applied to the depth of the main mass of the root system and provides the plants with nutritive substances throughout the entire growing period.

Through basic fertilization it is possible to create a certain level of soil fertility on individual fields and larger areas. Systematic, purposeful application of fertilizers from year to year makes it possible to stabilize and increase the content of humus and nutritive substances in the soil and to equalize the fertility of various fields.

Of the mineral fertilizers, some of the nitrogen and almost all of the phosphorous and potassium fertilizers are applied in the fall with basic plowing. The norms for the application of nitrogen fertilizers during fall plowing are established depending on the texture of the soil and the depth of the ground waters and the pebble bed. On soil where nitrogen can be lost during the autumn-winter and spring periods because of leaching (the sandy-pebble layers at a depth of 70-80 centimeters, and ground waters at less than 1.5 meters from the surface), the norm for nitrogen fertilizers in the autumn should not exceed 30-45 kilograms per hectare. In other cases, with average annual norms, a large amount of fertilizer is applied fall plowing, and then one is limited to the application of a single top dressing during the early periods of the plants' growth.

When fertilizers are applied during fall plowing, preference should be given to ammonium forms (urea, ammonium sulphate, and liquid ammonia) because of the fact that these fertilizers are leached from the soil less than nitrate forms of fertilizers are.

When nitrogen fertilizers are used it is also necessary to take into account the peculiarities of the growth, development and nutrition of the crops that are fertilized. Nitrogen is applied to winter grains during plowing only if the soil is very poor in nitrogen in an amount of 30-45 kilograms per hectare, and all the rest of the norm must be applied during the first (60-80 kilograms) and second (30-40 kilograms) top dressings. Nitrogen fertilizers are applied to barley planted on shallow soil in the high mountain valles of Narynskaya Oblast with plowing or in early top dressings. On soil where the pebble bed is deep they should be applied during fall plowing. Most frequently the annual norm for nitrogen is 90 kilograms per hectare. It is recommended to apply 150-180 kilograms of nitrogen per hectare to corn on soils that have been cultivated for a long time. This quantity should not be applied all at once because of the significant losses that are possible. If there is no danger of leaching, 90-120 kilograms of nitrogen are applied in the fall with the basic cultivation and the remaining 60 kilograms, in one top dressing. In places where the soil conditions make it impossible to apply fertilizers in the fall, they are applied with preplanting cultivation of the soil (60-90 kilograms) and in one or two top dressings.

In order to avoid a deterioration of the quality of the roots, the norms for nitrogen fertilizers for sugar beets should not exceed 200-240 kilograms of nitrogen per hectare. As was shown by the results of experiments conducted in recent years by the Kirghiz Scientific Research Institute of Farming (N. Pirogova), with these norms, some of the fertilizers (60-80 kilograms) should be applied in the autumn with fall plowing or with a preplanting cultivation of the soil, and the remainder, in one or two top dressings.

With cotton plants as well, some of the nitrogen fertilizers (60-70 kilograms of nitrogen) should be applied with fall plowing or preplanting cultivation and the remainder, in two top dressings (N. Kachkynbayev).

Phosphorus fertilizers are not very mobile in the soil and are fixed in those layers where the fertilizers are applied. Therefore surface top dressings of the plants with these fertilizers during the spring and summer periods when most of the physiologically active roots are at a depth of 10-15 centimeters does not contribute to increasing the yields. This has also been shown by the results of experiments that have been conducted.

In our research on ordinary northern sierozem soil, the application of P_{30} during deep plowing increased the grain yield of winter wheat by 2.6 quintals per hectare while the grain yield did not increase when the fertilizers were applied as top dressing. At the Issyk-Kul'skiy experimental station the application of P_{65} to light chestnut soil during plowing increased the grain yield by 3 quintals, while the yield remained at the level of the control variant when the fertilizers were applied as top dressing. At the Kirghiz experimental selection station on meadow sierozem soil that was poor in mobile phosphates, the application of P_{135} during fall plowing provided for an additional yield of sugar beet roots of 101 quintals and when there were two phosphorus top dressings with 67.5 kilograms of phosphorus per hectare each, the yield did not increase.

Yet certain farms still adhere to the practice of applying phosphorus fertilizers in top dressings. Thus, for example, in 1979 a considerable quantity of phosphorus fertilizers was applied to sugar beets on the Kolkhoz imeni Karl Marks, to grain spike crops and corn on the Druzhba Kolkhoz in Sokulukskiy Rayon, and to sugar beets on the Kolkhoz imeni Zhdanov in Issyk-Atinskiy Rayon.

Sometimes farm specialists are forced to apply phosphorus fertilizers in top dressings because they have no nitrogen fertilizers, and only mixed or compound fertilizers are available in the rayon associations. In such cases it is necessary to remember that phosphorus fertilizers should be applied in top dressings to a depth of no less than 18 centimeters and on soil that has poor supplies of mobile phosphates. And, as a rule, phosphorus fertilizers should be applied during fall plowing and during planting.

Differentiated application of phosphorus fertilizers according to cartograms is a guarantee of obtaining large yields, utilizing fertilizers efficiently and obtaining a high return from them. But kolkhoz and sovkhoz specialists, despite the availability of cartograms, sometimes apply phosphorus fertilizers taking into account only the peculiarities of the crop being planted: to grain crops -- 3-4 quintals of superphosphate, to sugar beets -- 7 quintals, and so forth. And on certain farms, obviously thinking that one cannot damage the soil with superphosphate, they apply considerably more than the required amount. In 1979, for example, on the Ala-Archa Sovkhoz in Alamedinskiy Rayon they applied 152 kilograms of phosphorus per hectare to corn and obtained a very small yield, and on the Ivanovskiy Hog Sovkhoz in Issyk-Atinskiy Rayon they applied 230 kilograms per hectare and obtained 45.3 quintals. On the Sovkhoz imeni Kalinin in the same rayon they applied twice as much phosphorus fertilizer to sugar beets as was envisioned by the agrochemical cartogram.

Experiments show that to obtain good grain yields from spike crops -- 40-50 quintals per hectare -- with an average phosphate content in the soil, it is sufficient to apply 45-60 kilograms of phosphorus per hectare. Only when the content of mobile phosphates is low, especially under the conditions of Narynskaya Oblast, should the norms for phosphorus fertilizers be increased to 90-120 kilograms per hectare, weighted dose.

No more than 90-120 kilograms of phosphorus are required to create a yield of sugar beet roots of 500 quintals per hectare. Very high norms of it, especially when there is a high content of phosphates in the soil, not only do not contribute to increasing yields, but can reduce them and worsen the quality of the roots.

For cotton plants one applies 100-120 kilograms of phosphorus per hectare in order to obtain 30-40 quintals of raw cotton. On soils that are very poor in mobile phosphates it is necessary to apply it with norms sufficient to increase the phosphate level to the average.

In recent years farms have been extensively applying complex compound and mixed fertilizers. They usually contain nutritive substances in soluble form and are well assimilated by the plants. When they are applied during the fall period their norm should be established according to the phosphorus content in the fertilizers.

At the present time the republic is devoting a great deal of attention to the application of potassium fertilizers. But the shortage of potassium in the balance in farming is great: 80-82 percent of the overall quantity of potassium consumed by the plants is not returned to the fields from which it is removed with the harvest. Therefore it is subsequently necessary to apply it extensively to agricultural crops, especially those such as cotton, sugar beets, corn and vegetables.

The fertilizer norms range from 60 to 120-150 kilograms per hecatre, weighted dose, depending on the exchangeable potassium content in the soil. Some of the potassium fertilizer, K_{30-60} can be applied in top dressings during the early phases of the plants' development.

One should attach special importance to organic fertilizers. At the present time the nutritive substances contained in the manure applied in the republic comprise one-fourth of the overall quantity of them applied with mineral fertilizers. Because of the manure the plants are provided with many trace elements. Manure is an important part of the circulation of substances in farming. When it is applied the physical, physical-chemical and aqueous qualities of the soil improve.

Manure is a valuable fertilizer. Mixed solid manure contains 0.4 percent nitrogen, 0.25 percent phosphorus and -.6-0.8 percent potassium. It contains half as much of these in liquid or semiliquid forms. But, taking into account that manure is applied in large quantities, a considerable quantity of nutritive substance is thus applied to the soil. Depending on the natural fertility of the soil, the predecessor and the application of fertilizers to the preceding crops, manure provides for an increase in the yield of grain from spike crops of 3.7 quintals per hectare, corn -- 10-20 quintals, and sugar beet roots -- 20-50 quintals per hectare. Manure is especially valuable for corn and vegetable crops. Experiments conducted in recent years by the Kirghiz Scientific Research Institute of Farming showed that the norms for organic fertilizers can be considerably increased: mixed solid manure -- to 60-80 tons, liquid -- to 70-80 cubic meters, and unprocessed poultry dung -- to 40-60 tons per hectare.

Organic fertilizers should be applied mainly during fall plowing. The liquid manure accumulated on animal husbandry complexes can also be used for top dressing when it is applied with irrigation water and diluted ten-fold.

An important problem at the present time with intensive farming is the creation of a certain humus balance in the soil. The main factors that affect it positively are periodic planting of perennial pulse grasses, the creation of conditions for their active growth, and the plowing under of all stubble. When there are no crop rotations or repeated plantings of row crops, or when the crop rotations include an excessive amount of row crops, the humus balance can be maintained at a certain level only through additional application of manure and composts. Many years of research conducted in our country and abroad have shown that with an annual application of 10-15 tons of manure per hectare to grain crops and 25-30 tons per hectare to row crops against a background of optimal norms of mineral fertilizers, it is possible to maintain the humus content at a certain level and even to increase it.

At the present time the republic has created a republic scientific-production and rayon production associations called Sel'khozkhimiya. This opens up new possibilities of increasing the effectiveness of fertilizers and utilizing them more efficiently.

On the other hand one must recall that conducting the entire complex of agrotechnical measures on a high agronomical level — the creation of conditions for accumulating moisture in the soil, prompt and uniform plowing that corresponds to the crop, good planting with high-quality seeds, and careful care for the planted areas -- all these are most important conditions for high effectiveness of the fertilizers that are applied during the basic cultivation of the soil.

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